Strategies to enhance small-scale commercial tree-growing inside state forests in Indonesia

Ani Adiwinata Nawir

Submitted to fulfilment of the requirements for the degree of

Doctor of Philosophy

of the Australian National University

June 2014

Australian National University

Candidate's Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of the author's knowledge, it contains no material previously published or written by another person, except where due reference is made in the text.

Ani Adiwinata Nawir Date: 5 June 2014

Acknowledgements

The completion of this thesis is largely the result of the generous support provided to me by the many people that I have had the chance to meet and work with.

My first acknowledgment goes to ACIAR (Australian Centre for International Agricultural Research) for the scholarship opportunity under the John Allwright Fellowship (JAF). Assistance provided by Russell Haines, Sharon Harvey, Mirah and Maria is very much appreciated. I would like also to acknowledge the contribution from my institution, CIFOR, in providing the research funding to do my fieldwork.

My great appreciation goes to all of the community tree growers who were involved in my research in the four case study sites in Sumbawa, Bima, Jambi and Sanggau, as well as collaborators from ComForLink and specifically from WKS and FI, WWF Nusa Tenggara, and also Forestry District Agency Staff in Sumbawa and Bima.

My appreciation goes primarily to my Supervisory Panel members, Professor Peter Kanowski (Chair), Dr. Michael Blyth and Dr. Jacky Schirmer. Support from Dr. Bruce Campbell, Dr. Terry Sunderland and Dr. Christine Padoch from CIFOR has also been very valuable, as well as advice from Dr. Budy Ressosudarmo and Dr Neil Byron. On top of that, I would like to thank Dr. Sue Holzknecht for her continuing support, both professionally and personally, while I was in Canberra. Assistance from other people in the Fenner School of Environment and Society has also been acknowledged, mainly the IT three musketeers (Karl, John and Steve), Amy, Cathy, Kevin, Tony and the cleaner guy from Macedonia.

My main gratitude goes to my family, Fathia Astrini Nawir, Nawir Messi, Radifan Khairi Nawir, my mom, brothers and sisters. The support of my friends in Bogor and Canberra and other PhD scholars at Fenner School are deeply appreciated, and a particular thank-you goes to Mary Walta, Alfa, Andy, Kulala, Nalish, Helen, Jess, Kevin, Simon and Daju, as well as my neighbour, George. Thanks so much to Emma for helping me submit my first and final thesis, as well as to Anne Looker (for the first submission) and Maxine McArthur (for the final submission) for their help with the editing.

Acknowledgements

The completion of this thesis is largely the result of the [illegible] the many people that I have had the chance to [illegible]

My first acknowledgement goes to NZAID (New Zealand [illegible] Research for the scholarship opportunity and to the John Allwright [illegible] Assistance provided by Russell Harvey, [illegible] approved. I would like also to acknowledge the contribution from [illegible] in providing the research funding for my fieldwork.

My great appreciation goes to all of the community [illegible] research [illegible] and also [illegible]

My appreciation goes primarily to my supervisors [illegible] Campbell, Dr. [illegible] as well as [illegible] would like to thank Dr. [illegible] and particularly [illegible] School of [illegible] [illegible] Nairobi [illegible]

My great gratitude goes to my family [illegible] my [illegible] [illegible]

Dedication

Especially dedicated to my father, Prof. Dr. R. H. Tandjung Adiwinata,

who was a dedicated scientist and professor in his field with a strong integrity and idealism.

Thank you!

Dedication

Especially dedicated to my father, Prof. Dr. [illegible]

who was a dedicated scientist and professor [illegible]

[illegible]

Abstract

Wood supply shortages are evident in Indonesia's forestry sector in both high-value products and commodity products, such as pulpwood. Small-scale tree-growing can fill some of these gaps, while enhancing local livelihoods. Much of the potential land on which small-scale commercial tree-growing can take place is on degraded land inside state forests. Two current schemes in this context are the community forestry (*Hutan Kemasyarakatan*) and community-company partnership (*Kemitraan*) schemes.

This research seeks to inform policies to enhance the implementation of small-scale commercial tree-growing inside state forests by addressing four questions:

1. What are the advantages and disadvantages of the two current schemes?
2. What are the benefits and costs, in both social and economic terms, of the two existing schemes in comparison to other investment options using the same lands?
3. How does this analysis suggest policies and schemes to promote small-scale commercial tree-growing in Indonesia should be designed?
4. How does this information and analysis inform decision-makers on the potential contribution of timber from small-scale commercial tree-growing to the wood production strategies in Indonesia?

Questions 1 to 3 were addressed by analysing case studies relating to community tree-growing in the Sumbawa and Bima Districts (West Nusa Tenggara), and to community-company partnerships in Jambi (Sumatra) and Sanggau (West Kalimantan). Question 4 was addressed through a desktop analysis of demand and supply data and projections.

Both schemes were developed initially to reinforce the status of state property suffering from encroachment and illegal logging. Despite their effectiveness in containing these pressures, the active involvement of the community under the two schemes remains an option of last resort for communities, in part because of actual, transaction, and opportunity costs. Developing tree-growing inside state forests is complicated in comparison to tree-growing on privately owned land. The financial analyses conducted suggest that the commercial viability of these schemes has generally been unconvincing, but there are conditions in which these schemes are likely to be sufficiently rewarding and sustainable. For example, social capital from the

collaborative arrangements under the two schemes has allowed community access to state forests and to benefits from timber plantations, as well as a way to generate some of the other capital required by households.

Acacia plantations managed under partnership schemes provide estimated annual benefits per hectare of Rp 1.5 million (AUD 177) for typically stocked stands, and Rp 13 (AUD 1,483) for fully stocked stands. Fully stocked stands under community tree-growing schemes generate annual benefits per hectare ranging from Rp 10 million (AUD 1,176) to 15 million (AUD 1,838). For typically stocked stands, annual benefits per hectare range from negative benefits of Rp 0.25 million (AUD 29) to Rp 1 million (AUD 139), depending on the management regime. In comparison, the annual benefits per hectare for alternative crops are: (1) a combination of cashew and candle nuts—Rp 1.2 million (AUD 136); (2) independently developed smallholder of oil palm plantations—Rp 2.2 million (AUD 258); (3) rubber plantations using local species—Rp 2.7 million (AUD 316); and (4), a combination of turmeric and ginger—Rp 5 million (AUD 563). In summary, where stands are fully stocked, both community tree-growing and partnership schemes can be competitive with some, but not all, alternative land uses.

Wider implementation of the tree-growing schemes is hampered by inconsistencies between policies and regulations in force at the national and district levels. The national policy is more important for partnership schemes, since it provides secure access and flexible management opportunities, whilst the regional autonomy exercised by district governments has provided advantages for community tree-growing. Increasing the productivity and thus the returns from tree-growing is necessary if smallholder tree-growing is to be competitive compared to other investment alternatives, and contribute more to wood production targets regionally and nationally.

Analysis at the national level suggests that there is a large and continuing gap between industry capacity and wood supply from Indonesia's forests. Scenario analysis suggests that, with the right enabling conditions, the different smallholder tree-growing schemes can contribute wood supply that is many orders of magnitude greater than the industry requirements.

Table of Contents

List of Tables

List of Figures

List of Boxes

List of Appendices

List of acronyms and abbreviations

(For specific list of glossary and terms, see Appendix 1-1)

ACIAR	Australian Centre for International Agricultural Research
APHI	*Asosiasi Pengusaha Hutan Indonesia,* Association of Indonesian Forest Concessionaires
APL	*Areal Penggunaan Lain,* Forested/non-forested areas outside state forest
AUD	Australian Dollar (for this thesis, using the rate current in 2009 (AUD 1 = Rp 8,432)
BAPLAN	*Badan Planologi Kehutanan,* Forestry Planning Agency
BKPH	*Bagian Kesatuan Pemangkuan Hutan,* Forest Sub-district Office
BKSDA	*Balai Konservasi Sumberdaya Alam,* Institute for Natural Resources Conservation
BPK	*Bina Produksi Kehutanan,* Forestry Production Management
BPN	*Badan Pertanahan Nasional,* National Land Agency
BRLKT/Sub BRLKT	*Balai/Sub Balai Rehabilitasi Lahan dan Konservasi Tanah,* Centre/Sub-Centre for Land Rehabilitation and Soil Conservation
BPDAS	*Balai Pengelolaan Daerah Aliran Sungai,* Institute for Watershed Management and Development,
BTPDAS	*Balai Teknologi Pengelolaan Daerah Aliran Sungai,* Institute for Watershed Management Research and Development
BUMDES	*Badan Usaha Milik Desa,* village-owned enterprise
CBA	Cost Benefit Analysis
CBFM	Community-based Forest Management
CBG	Community Business Group, *KUB*
CD	Community Development
CIFOR	The Center for International Forestry Research
ComForLink	Community-Company Forestry Link
CPI	Consumer Price Index
CSR	Corporate Social Responsibility
DAFED	Agriculture and Forestry Decentralisation Extension Programme
Ditjen BPK	*Direktorat Jenderal Bina Produksi Kehutanan,* Directorate General of Forestry Production Management, Ministry of Forestry
DG LRSF	Directorate General of Land Rehabilitation and Social Forestry
Ditjen PHKA	*Direktorat Jenderal Perlindungan Hutan dan Konservasi Alam,* Directorate General of Forest Protection and Nature Conservation
Ditjen RLPS	*Direktorat Jenderal Rehabilitasi Lahan dan Perhutanan Sosial,* Directorate General of Land Rehabilitation and Social Forestry
DKB	*Dokumen Kayu Bulat,* Document of Round Wood
DPKB	*Dokumen Pelaporan Kayu Bulat,* Reporting Document on Round Wood
DPR	*Dewan Perwakilan Rakyat,* People's Consultative Assembly
DPRD	*Dewan Perwakilan Rakyat Daerah,* District House of Representatives
DR	*Dana reboisasi,* Reforestation Fund
EAE	Equal Annual Equivalent
FA	*Faktur Angkutan,* Transporting Invoice
FA-KB	*Faktur Angkutan Kayu Bulat,* Transporting Invoice for Round Wood to be attached to wood being transported to mill or to other industries
FAO	Food and Agriculture Organisation of the United Nations

FDA	Forestry District Agency, *Dinas Kehutanan Kabupaten*
FFB	Fresh Fruit Bunches
FGD	Focus Group Discussion
FoB	Freight on Board
FORDA	Forestry Research and Development Agency
FORKOD HKm NTB	*Forum Komunikasi Hutan Kemasyarakatan Propinsi Nusa Tenggara Barat* (Communication forum on community forestry in West Nusa Tenggara Province)
FI	Finnantara Intiga, Industrial timber plantation concession holder
FWI/GFW	Forest Watch Indonesia/Global Forest Watch
GoI	Government of Indonesia
HGB	*Hak Guna Bangunan,* Right to Build
HGU	*Hak Guna Usaha,* Estate Land Right
HKm	*Hutan Kemasyarakatan,* Community Forestry Scheme
HP	*Hutan Produksi,* Production Forest
HPH	*Hak Pengusahaan Hutan,* Concession Right Holder
HPHTI or HTI	*Hak Pengusahaan Hutan Tanaman Industri,* Concession Right for Industrial Plantation Forest
HTHR	*Hutan Tanaman Hasil Reboisasi,* Timber Plantation (resulting) from the Rehabilitation Programme.
HTPK	*Hutan Tanaman Pola Kemitraan,* partnership arrangement developed inside a company concession area
HTR	*Hutan Tanaman Rakyat,* Community-based Forestry Plantation Programme
HRPK	*Hutan Rakyat Pola Kemitraan,* partnership arrangement initiated on private land owned by an individual or by a community as a group
HTI	*Hutan Tanaman Industri,* Industrial Plantation Forest
HTI swakelola	*Hutan Tanaman Industri swakelola,* Self-funded Industrial Timber Plantation
HTI Trans	*Hutan Tanaman Industri Transmigrasi,* Transmigration Industrial Plantation Forest
ICRAF	International Centre for Research in Agroforestry
IMF	International Monetary Fund
INPRES	*Instruksi Presiden,* Presidential Instruction
INTAG	*Inventarisasi dan Tata Guna Hutan,* Forest Inventory and Land Use
IPB	*Institut Pertanian Bogor,* Bogor Agricultural Institute
IPK	*Ijin Pemanfaatan Kayu,* Right to Timber Utilisation Permit
IPPK	*Ijin Pemungutan dan Pemanfaatan Kayu,* Right to Timber Extraction and Utilisation Permit
IRR	Internal Rate of Return
ITTO	International Tropical Timber Organisation
IUPHHK	*Izin Usaha Pemanfaatan Hasil Hutan Kayu,* Licence to collect timber as a Concession Right Holder *(HPH)*
Juklak	*Petunjuk Pelaksanaan,* Implementation Guidelines
Juknis	*Petunjuk Teknis,* Technical Guidelines
KKN	*Korupsi, Kolusi dan Nepotisme,* Corruption, Collusion and Nepotism
KKPH	*Kepala Kesatuan Pemangkuan Hutan,* Head of District Forest Office
KTMR	*Kelompok Tani Mitra Rehabilitasi,* Farmer Group Partnership for Rehabilitation
KUB	*Kelompok Usaha Bersama,* Community Business Group (CBG)

KUK DAS	*Kredit Usahatani Konservasi Daerah Aliran Sungai,* Farming Credit for Watershed Conservation
LHC	*Laporan Hasil Cruising* , Timber Cruising/Inventory Report
LHP	*Laporan Hasil Produksi* (Felling report)
LEI	*Lembaga Ekolabeling Indonesia,* Indonesian Ecolabeling Institution
LEV	Land Expectation of Value
LKAD	*Lembaga Kerjasama Antar Desa,* Inter-villages Cooperation Body
LKMD	*Lembaga Ketahanan Masyarakat Desa,* Community Welfare Organization at Village Level
LSM	*Lembaga Swadaya Masyasrakat,* Non-Government Organization
MoA	Ministry of Agriculture
MoF	Ministry of Forestry
Menhut	*Menteri Kehutanan,* Ministry of Forestry
MPR	*Majelis Permusyawaratan Rakyat,* People's Consultative Assembly
MP-RHL	*Master Plan-Rehabilitasi Hutan dan Lahan,* The Master Plan for Forest and Land Rehabilitation
MPTS	Multi-purpose Tree Species
NBIR	Net Benefit Investment Ratio
NSF Programme	National Social Forestry Programme
NT	*Nusa Tenggara*
NTB	*Nusa Tenggara Barat,* West Nusa Tenggara
NGO	Non-Government Organisation
NTFP/NTFPs	Non-Timber Forest Product/Non-Timber Forest Products
NPV	Net Present Value
PAD	*Pendapatan Asli Daerah,* Local Government Revenue
PBB	*Pajak Bumi Bangunan,* Tax on Land and Buildings
PFA	Provincial Forestry Agency, *Dinas Kehutanan Propinsi*
PEDUM	*Pedoman Umum,* General Guidelines
Perda	*Peraturan Daerah,* Local Government Regulation
PSDHBM	*Perda PSDHBM-Peraturan Daerah Pengelolaan Sumber Daya Hutan Bersama Masyarakat* (District regulation on collaborative forest resource management with the community)
PES	Payment for Environmental Services
PHBM	*Pengelolaan Hutan Bersama Masyarakat,* Forest Management with the Community
PIR/NES	*Perkebunan Inti Rakyat,* Nucleus Estate Smallholder
PKT	*Perhutanan dan Konservasi Tanah,* Forestry and Soil Conservation Service
PKSK Unram	*Pusat Kajian Sumberdaya Kehutanan, Fakultas Pertanian Universitas Mataram* (Research Centre on Forestry Resources, Faculty of Agriculture, Mataram University)
PLK	*Penyuluh Lapang Kehutanan,* Forestry Extension Field Officer
PP/GR	Peraturan Pemerintah/Government Regulation
PRA	Participatory Rural Appraisal
PSDH	*Provisi Sumber Daya Hutan,* Forest Resource Rent Provision
PSDHBM	*Pengelolaan Sumber Daya Hutan Berbasis Masyarakat,* Community-based Forest Management
RHL	*Rehabilitasi Hutan dan Lahan,* Land and Forest Rehabilitation
RKPH	*Rencana Karya Pengusahaan Hutan,* Work Plan for Forest Management
RKT	*Rencana Karya Tahunan,* Annual Work Plan

RLKT	*Rehabilitasi Lahan dan Konservasi Tanah,* Land Rehabilitation and Soil Conservation
RLPS	*Rehabilitasi Lahan dan Perhutanan Sosial,* Land Rehabilitation and Social Forestry
RTRW	*Rencana Tata Ruang Wilayah,* Regional Spatial Planning
RTRWP	*Rencana Tata Ruang Wilayah Propinsi,* Provincial Regional Spatial Management Plan
Rp	Rupiah, Indonesian currency
SFM	Sustainable Forest Management
SKSHH	*Surat Keterangan Sahnya Hasil Hutan,* Log Transport Permit/s
SKSKB	*Surat Keterangan Sahnya Kayu Bulat,* Round wood legality letter
SKT	*Surat Keterangan Tanah,* Land Papers (signed by the Head of Sub-district)
SPKS	*Surat Perjanjian Kerjasama,* Contract Agreement
SPH	*Surat Pengakuan Hak,* Land Papers (signed by the Head of the Village)
TFT	Tropical Forest Trust
TGHK	*Tata Guna Hutan Kesapakatan,* Forest Land-Use Consensus
TGLDK	*Tata Guna Lahan Desa Kesepakatan,* Forest Land-Use Consensus at Village Level
USA	United State of America
USD	US Dollars
WB	World Bank
WKS	*Wirakarya Sakti,* Industrial timber plantation concession holder
WNT	West Nusa Tenggara *(Nusa Tenggara Barat)*
WWF	World Wildlife Fund

Chapter 1. Introduction

1.1. The research context: background and issues in the global context and in Indonesia

1.1.1. Global context: increasing roles of small-scale plantations

Globally, deforestation has continued at a high rate of some 13 million hectares (ha) per year, mainly due to conversion of forests to agricultural land (FAO, 2006a; 2009; 2012). In contrast, forest plantations have increased from 156 million ha in 1990 to 205 million ha in 2005 (FAO, 2006). Although has not been widely accepted by critics (e.g. Gerber, 2011), FAO (2006a) claimed this growth in plantation area has contributed in reducing the net loss of global forest areas by 1.6 million ha per year during the period 2000 to 2005 compared to the period 1990 to 2000.

The increases in the area of forest plantations[1] since 1990 are due to a three-fold increase in small-scale tree-growing (12% in 1990–2000 to 32% in 2000–2005), a corresponding decrease in public ownership (62% to 42%), and almost no growth in corporate ownership (close to 25% in both periods) (FAO, 2006; Carle, 2007; 2012). Considering that plantation development was previously predominantly the domain of states and/or the private corporate sector, there has been significant progress in favour of small-scale tree-growing (White and Martin, 2002; Garforth *et al.*, 2005; Hoch *et al.*, 2012).

Following the continuing depletion of natural forests and the increasing trend of smallholder ownership of productive forest resources, small-scale forest plantations are becoming increasingly important as a major industrial wood supply source in many parts of the world (Williams, 2000; Bampton and Cammaert, 2007; Nawir *et al.*, 2007c; Hoch *et al.*, 2012; Duguma, 2013). There is a promising potential demand for wood products coming from small-scale plantations, which may have comparative advantages over industrial plantations and forests in some markets (Angelsen and Wunder, 2003; Nawir *et al.*, 2007c; Bliss and Kelly, 2008; Hoch *et al.*, 2012; Duguma, 2013). For example, they may operate at a lower cost structure for some products due

[1] The term plantations used here follows the FAO definition (FAO, 2006b): productive forest plantations are primarily established as defined forest areas for wood and fibre production.

to lower opportunity costs for labour and land compared to large-scale operations (Scherr, 1995; Scherr, 1997; Scherr, 2004; Hoch *et al.*, 2012; Duguma, 2013).

Further, fostering commercial tree-growing in favour of the poor has become an important focus of several strategies proposed and initiated by leading forestry agencies to alleviate poverty among rural communities (Arnold, 2001b; Arnold, 2001a; Mayers, 2006; Durst, 2007; Warner, 2007; Hoch *et al.*, 2012; Duguma, 2013). The main reason is the small share of the billions of dollars of commercial benefits from extensive wood production and processing based on exploitation of state-owned forest resources going to rural communities and small-scale producers in developing countries (Arnold, 1997b; Angelsen and Wunder, 2003; Nawir *et al.*, 2007c). Other driving factors include: global pressures towards socially responsible practices that have forced many companies to revisit their relationships with the local communities; the devolution of forest management from government to local stakeholders, resulting in increased ownership by smallholders; decreasing government budget to handle most of the forest plantation investments; and the failure of government-based and private-based plantation programmes that have stimulated the search for viable alternative options (Enters *et al.*, 2003; FAO, 2003; Angelsen and Wunder, 2003). Further, Agrawal *et al.* (2008) identified greater participation by those who use and depend on forests, as well as actors along the product value chains, as one of the important factors for effective governance in addressing current and future challenges in relation to natural resources management.

Despite the opportunities, small-scale plantations are vulnerable to technical, institutional, commercial (e.g. market risks), and policy challenges (Arnold, 1997a; Scherr *et al.*, 2003; Scherr, 2004; Carle, 2007; Nawir *et al.*, 2007c; Hoch *et al.*, 2012; Duguma, 2013; Herbohn *et al.*, 2014; Byron, 2001). Commercial and business knowledge and skills among small-scale tree growers is also limited, resulting in weak bargaining power in the negotiation process for wood harvesting, selling and transport, and for contracts and agreements with companies or other players in the business (Carle, 2007; Midgley *et al.*, 2007a; Nawir *et al.*, 2007c).

Complex policy barriers have created significant transaction costs beyond the capacity of an individual smallholder at the farm and processing levels. These costs eventually affect the continuity of timber supply and competitive markets (Scherr *et al.*, 2003; Adhikari and Lovett, 2006; Nawir *et al.*, 2007c; Roshetko *et al.*, 2007; Hoch *et al.*, 2012; Duguma, 2013). Moreover, little research has been done on small-scale community forest owners as economic entities outside the household as commercially oriented small private enterprises (Current *et al.*, 1995; Antinori and Bray, 2005; Montambault and Alavapati, 2005).

1.1.2. The Indonesian context: the importance of small-scale tree-growing strategies in forest plantations development

Indonesia is continuing to experience large-scale forest loss and degradation as a result of both legal and illegal timber harvesting and the conversion of forests to other land uses. Some 21.7 million ha of Indonesia's 127 million ha[2] of natural forest were lost in the decade to 2000 and as a result, timber production from natural forests has decreased significantly (FAO, 2006a; Pesket, 2010; Irawan *et al.*, 2013). Indonesia's total log production decreased from 36 million m^3 in 1993 to about 22 million m^3 in 2007 (ITTO, 2007). However, information on total round wood production has been clouded by inconsistencies in the data from various sources. Total round wood production could be overestimated if data were based on official statistics from the Ministry of Forestry (MoF), or underestimated if the data were based on data published by environmental NGOs and/or estimated by using different methods (Indrarto *et al.*, 2012 ; Nawir *et al.*, 2013). In 2010, the national wood production was estimated to be 42.4 million m^3, based on MoF data that are considered to be optimistic with the assumption of a steady total annual growth from all sources in the last 20 years, which leads to a wood gap estimation at 29.2 million m^3 in failing to meet a total of 71.7 million m^3 of round wood demanded (MoF, 2010c). On the other hand, a lower estimation of timber production suggests the wood gap could be almost double this, at 48.9 million m^3 (Indonesian Working Group on Forest Finance, 2010). Following an initial two-year moratorium policy on new logging concessions in primary forests and peat lands applied since 2011 and subsequently extended for three more years, timber production may be predicted to decline further (ITTO, 2011). Section 7.2, Chapter 7,

[2] More recent forest area estimates were made using different methods, which resulted higher total forest area estimate of some 133 million ha in 2010 (e.g. discussed in Indrarto, *et al.* (2012) and Nawir *et al.* (2013). However, to maintain consistency with other forest statistics published by government, the earlier figure is used in this thesis.

further discusses the estimation of wood gaps in relation to wood production and consumption.

In 2005, Indonesia had the sixth largest area of forest plantations in the world at 3.4 million ha of productive plantations. These had been developed mostly by the private sector on state forest land from 1985, facilitated by the government's incentive package (Handadhari, 2001; FAO, 2006a). Despite this, the expansion of large-scale industrial plantation forests has been slower than the MoF intended, as indicated by the 2005 plantation area that represented only 54% of the total target of 6.3 million ha initially planned in 1985 by the MoF to be achieved by 2000 (Kartodihardjo and Supriono, 2000; Handadhari, 2001). More recently, MoF claimed that the total planted area up to the second quarter of 2011 was 5.1 million ha (MoF, 2011). The slow progress was mainly due to social problems associated with large-scale plantation development, including conflict over forest resources with local communities, and intense competition with state-supported investments in estate crops (Kartodihardjo and Supriono, 2000; Muhtaman *et al.*, 2000; Gintings, 2001; Nawir and ComForLink, 2007). Among the conflict resolution mechanisms set up since the late 1990s is the initiation by companies of various partnership schemes with local rural communities to establish new plantation areas (Nawir *et al.*, 2003a; Nawir and Santoso, 2005; Maturana *et al.*, 2005).

Driven by the slow development of industrial plantations and seeing the potential of small-scale plantations as a means to alleviate poverty ('pro-poor'), create new employment opportunities ('pro-job') and improve the distribution of economic growth among different stakeholder groups ('pro-growth'), the MoF introduced a community-based plantation forest programme (*Hutan Tanaman Rakyat-HTR*) in 2006 (Minister of Forestry of Indonesia, 2006). The *HTR* programme targets community groups and individuals, granting them rights to receive a total projected area of 5.4 million ha of state forest land to be developed as plantation forests over the period 2007 to 2016 (Director General of Forestry Production Management, 2006). Granting community rights under *HTR* is a very positive development in terms of addressing tenure conflicts, particularly as this allows communities greater involvement in plantation forest development within state forests, a role that companies have dominated since 1985. These *HTR* forests are part of the total of a further 9 million ha of plantation forests planned for Indonesia, with the remaining 3.6 ha planned to be developed under the Programme of Industrial Plantation Forest or *HTI-Hutan Tanaman Industri* (Director General of Forestry Production Management, 2006). In 2009, the MoF set a new target for plantation development under the *HTI* Programme alone at 9 million ha by 2014 (MoF, 2009b). The MoF also intends its *HTR* programme to include partnership schemes between the private sector and community groups. However, there is still a lack of well-defined strategies to achieve successful implementation to meet the set target (Nawir and ComForLink, 2007).

Reflecting government's high expectation towards community-based initiatives to fill the gaps in meeting the wood demand, MoF has recently set a high target, to be achieved by 2015. For various community-based programmes across all forest classification[3] the targets are: 5.4 million ha for *HTR*, 2.1 million ha for village forest *(Hutan Desa*[4]*)*, community forestry *(Hutan Kemasyarakatan - HKm)*, and private tree-growing *(Hutan Rakyat)* (Partnership for Governance Reform, 2011). Further discussion on the actual development with regards to these targets is included in Section 7.2.1 of Chapter 7.

1.1.3. Smallholder and community tree-growing strategies and challenges inside state forests in Indonesia

1.1.3.1. Smallholder and community tree-growing

This thesis focuses its analysis on two principal strategies for involving communities in small-scale tree-growing inside state forests in Indonesia. The first is *Hutan Kemasyarakatan (HKm)*, commonly translated in the Indonesian literature as a 'community forestry scheme'; in this thesis, the term 'community tree-growing' is used. The second is the community-company partnership scheme, or *Kemitraan*.

In addition to tree-growing inside state forests, even though it is not included as a focus in this thesis, it is worth noting the *Hutan Rakyat* scheme,[5] which is usually

[3] Some 127 million ha of forest area in the country are managed by the state; therefore, it is referred to as 'state forests' (See Section 5.2.2 for further discussion). Outside state forests, there are 'private forests', owned and managed by local community (See Appendix 7-10 for further discussion).

[4] State forest formally allocated to the village community, who traditionally have been managing the area, to support the livelihoods and welfare of the community.

[5] See Appendix 7-10 for more discussion on lessons learnt from this scheme.

established in the form of agroforestry, and is commonly translated in the Indonesian literature as 'farm forestry'; in this thesis, the term private tree-growing is used. Private tree-growing is usually established on individual plots of privately owned land by community members outside state forests, and was initially promoted under a government-assisted reforestation program in the early 1970s (Darusman and Hardjanto, 2006; Hindra, 2006; Nawir *et al.*, 2007g; Sumedi, Undated). The most intensive development can be found in Java, consistent with the higher level of development and concentration of households participating in commercial forestry activities; in contrast, in the other Indonesian islands, progress has been very limited. There is an extensive literature studying different aspects of this scheme, which provides good lessons learnt for defining better strategies for enhancing small-scale tree-growing inside state forests (see Appendix 7-10). Increasingly, the community-company partnership scheme has also been implemented on privately owned land, as discussed in Chapter 5.

The community tree-growing scheme is one of several government-initiated programs since the early 1980s to involve communities in state forest management for a certain purpose, such as forest conservation or rehabilitation (MoF, 2002a; Hindra, 2005). Since it was initially developed, the approaches, types and levels of community participation have been evolving, under the influence of the government's policy orientation, such as the decentralisation policy implemented since 1999 (Colchester, 2002a; White and Martin, 2002; Safitri, 2006; Fujiwara *et al.*, 2012). There have been also several other government-initiated programmes to involve local communities since the early 1970s (see Appendix 1-1). However, there is little evidence that implementation of these programmes has been successful, since they were top-down initiatives and charity-oriented implementations by private companies instead of the pro-active involvement of the local community, and the programmes were only focussed on short-term objectives to fulfil companies' responsibility under government regulations (PESUT, 1996; Kartodihardjo and Supriono, 2000).

Under the *HKm* scheme, in which the community tree-growing scheme is embedded, a community as a group can be granted the usufruct rights to manage a certain allocated area following an approved proposal submitted by the community as a group to the

Minister of Forestry (MoF, 2009d). Specifically, according to this regulation, the usufruct right focuses principally on managing and harvesting non-timber forest products (NTFPs) in protected forests and national parks; however, this can be upgraded to having limited planting and harvesting rights in state production forests.[6]

The second form of tree-growing is a partnership scheme between a community and a company, resulting from initiatives taken by some companies since the late 1990s, as part of their efforts to resolve long-term land conflicts inside their concessions (Nawir *et al.*, 2003b; Maturana *et al.*, 2005; Schneck, 2009). This partnership is defined as two or more parties jointly managing land, capital, and market opportunities with the main objective of producing a commercial forest crop or timber in a plantation forest based on a contractual agreement (Race, 1999; Mayers, 2000; Mayers and Vermeulen, 2002). In the Indonesian context, the partnership scheme comprises companies and growers, who plant trees either inside or the outside the company's plantation concession (Nawir *et al.*, 2003b). Companies consider this partnership approach to be an effective strategy for immediate conflict resolution (Nawir *et al.*, 2003b; Nawir and ComForLink, 2007).

1.1.3.2. Challenges in smallholder and community tree-growing

In Indonesia, there is a promising market for timber from small-scale plantation expansion through various strategies, as there is excess capacity in Indonesia's wood processing industries, both for fast-growing species like acacia and for high-quality wood like teak (Barr, 2001; Triple Line Consulting, 2005; Harada and Wiyono, 2014). As discussed in Section 1.1.2 above, Indonesia has been experiencing a shortage of 29.24 million m^3 of logs, under the optimistic scenario, to meet the installed capacity of wood processing mills for sawn wood, plywood, pulp, veneer, furniture and flooring (Triple Line Consulting, 2005; Midgley *et al.*, 2007b; MoF, 2010c; Indonesian Working Group on Forest Finance, 2010). In addition, there are up to one million small and home-based unregistered industries which serve as sub-contractors to larger

[6] In the Indonesian context, state production forest refers to the designated state forest areas that can be managed for commercial purposes under a granted right provided by the Ministry of Forestry (MoF) for a certain period. For the purpose of this research thesis, the community forestry schemes included are only those with timber plantation forests as the main program being implemented, and do not include those that focus on NTFP by itself.

companies, and which require a certain amount of wood supply (Triple Line Consulting, 2005). However, despite the promising market opportunities, small-scale plantations in Indonesia are still facing significant challenges with interconnected management, social, economic, policy and governance (Potter and Lee, 1998; Nawir, 2000; Nemoto, 2002; Nawir *et al.*, 2003b; Hindra, 2005; Darusman and Hardjanto, 2006; Nawir and Manalu, 2006; Midgley *et al.*, 2007b; Perdana *et al.*, 2012; Sabastian *et al.*, 2014; Harada and Wiyono, 2014; Sumedi, Undated).

Tree growers generally have limited access to markets, and limited access to market information (Nawir, 2000; Triple Line Consulting, 2005; Midgley *et al.*, 2007b; Perdana *et al.*, 2012; Harada and Wiyono, 2014). Moreover, in many government-initiated community tree-growing schemes, the market linkages are often unclear, and so intended benefit-sharing cannot be secured (Nawir and ComForLink, 2007; Nawir *et al.*, 2007e; Perdana *et al.*, 2012; Harada and Wiyono, 2014). Moreover, the lack of proper silvicultural practices has resulted in low timber quality and quantity, leading to low revenues from timber sales (CIFOR and ICRAF, 2006; Noordwijk *et al.*, 2008; Roshetko *et al.*, 2008; Sabastian *et al.*, 2014). Further, due to the lack of capacity among tree growers to do self-grading of their timber productions, smallholders also tend to accept uniform prices for all qualities, often well below market rates (Nawir, 2000; Nemoto, 2002; Triple Line Consulting, 2005; Nawir and Manalu, 2006; Harada and Wiyono, 2014). From the timber demand side, the large-scale pulp-producing industries, and teak-based wood-processing enterprises have concerns regarding the continuity of wood supply from community plantations, as well as meeting the quality specifications for their wood-processing equipment (Triple Line Consulting, 2005; Nawir and ComForLink, 2007; Harada and Wiyono, 2014). These concerns have limited the expansion and product development plans of companies (Triple Line Consulting, 2005).

The MoF has developed specific economic incentive packages, such as designing a credit scheme for the *HTR* programme under the assumption that a lack of capital is the main problem (Nawir and ComForLink, 2007). However, such interventions are usually recommended and implemented before completing an appropriate comprehensive economic analysis, and so have been mostly ineffective. The actual costs and potential returns are not fully understood by policy makers, resulting in provision of incentive packages that do not match growers' needs (Enters *et al.*, 2003; Nawir *et al.*, 2007g).

To varying degrees, these aforementioned challenges have affected the optimal development of the two different strategies for developing smallholder tree-growing inside state forests; it is more challenging than planting on privately owned land outside state forests. A comparative analysis of the advantages and disadvantages of these strategies, including these various challenges, has not been comprehensively researched, nor have the socio-economic factors affecting the competitiveness of wood from these schemes. Such a comparative analysis will be important in informing policy recommendations to promote small-scale commercial tree-growing as part of the strategies for meeting the target of timber production at national level. The potential for timber production from community tree-growing and community-company partnership schemes is further discussed in Chapter 7.

1.2. Identified research problems, aim, objectives and research questions

As discussed in Section 1.1 above, prior studies identified two main problems that have prevented strategies for smallholder tree-growing in Indonesia from developing optimally. Firstly, there has been a lack of understanding about the interconnected impediments in small-scale tree-growing in relation to management, socioeconomic and policy aspects, as well its relative advantages in comparison to other investment options. Specifically, this lack of understanding has happened under conditions in which the proposed policy and economic incentives for small-scale tree-growing development have often been counter-productive to its competitiveness. Secondly, the potential timber contribution to the national wood supply for specific market niches has not been identified, despite recognition of the unique characteristics and the relative advantages of small-scale tree-growing management and products. Therefore, the aim of this research is to identify strategies will inform policies to enhance the implementation of commercial tree-growing by farmers and communities in Indonesia, focussing on those within the designated state forest area. The research is guided by four overarching research questions that the thesis addresses:

1. What are the advantages and disadvantages of the two current schemes?
2. What are the benefits and costs, in both social and economic terms, of the two existing schemes in comparison to other investment options using the same lands?
3. How does this analysis suggest policies and schemes to promote small-scale commercial tree-growing in Indonesia should be designed?
4. How does this information and analysis inform decision-makers on the potential contribution of timber from small-scale commercial tree-growing to the wood production strategies in Indonesia?

1.3. Summary of conceptual framework for analysing strategies to enhance commercial tree-growing in Indonesia

Guided by the research questions, the conceptual framework consists of two main components. These components comprise discussions of the conditions necessary for socioeconomically feasible management of small-scale commercial tree-growing, and of the most favourable conditions for small-scale tree-growing to be more competitive commercially.

Firstly, the conditions for socioeconomically feasible management of small-scale commercial tree-growing are determined by: motivating factors and tree-growing objectives; the endowment characteristics of small-scale tree-growing management; the market structure and access to markets; and institutional and policy conditions. Specific challenges for socioeconomically feasible management are also identified. Secondly, a framework of incentives tailored to addressing the challenges constraining small-scale tree-growing from becoming more commercially competitive is identified and its implications are analysed.

As presented in Chapter 2, these theoretical concepts bring together the elements for developing an integrated conceptual framework of small-scale commercial forest plantation enterprises. There are some inter-related and overlapping applications of the two different frameworks mentioned above in addressing particular research questions. There are two main justifications for combining several frameworks in this research, instead of adopting a single theoretical framework. First, considering the multifaceted research questions and the scope of the analysis, a single theoretical framework is unlikely to satisfactorily provide the overarching concepts necessary for conducting the analysis. Second, it is possible to utilise many of the strengths (and compensate for the weaknesses) of each theoretical framework by incorporating both of them. Similar attempts to move away from single disciplinary concepts are occurring in many disciplines (Mingers and Brocklesby, 1997; Mingers, 2001; Turner *et al.*, 2007; Ostrom, 2009). This is further discussed in Section 3.2 of Chapter 3.

1.4. Summary of research design and data sources

The analysis in this thesis is based on case studies that were also part of two previous projects. In these two projects, I had the responsibility for leading the development of research designs and for collecting data collaboratively, as well as for data analysis. This PhD research contributes additional data and analyses, building on the outcomes of the two projects and analysing the two schemes' relative advantages under certain socioeconomic and institutional and policy conditions. Further, my thesis presents detailed economic analysis based on practical experiences on the ground in developing assumptions, and links the analysis with relevant qualitative information and data to better understand specific quantitative results. Chapter 3 (Table 3-15) presents detailed information on the data collected and used from previous projects and during my PhD research.

Case studies on the community tree-growing scheme were a part of projects jointly funded between CIFOR (Center for International Forestry Research) and WWF (World Wildlife Fund) Indonesia (2002–2005) on 'Profit sharing analysis of community partnership in the District of Sumbawa and Bima, West Nusa Tenggara Province'. Case studies on the community-company partnership scheme were based on cases in Batang Hari/Muara Jambi (Jambi Province) and in Sanggau (West Kalimantan Province) (see Section 3.4, Chapter 3 for further details). These were part of project fully funded by CIFOR (2000–2004) on 'Community-company partnership scheme analysis'. All of these schemes still continue.

The overarching criteria for choosing case study sites consistent with my PhD research objectives were: (1) representing one of the two tree-growing practices being researched that are implemented widely by local communities; (2) the existence of commercialisation opportunities, such as from wood processing industries, and a local timber market; and (3) a local policy framework in relation to tree-growing practices had at least been initiated by the local government (Nawir *et al.*, 2003b; Nawir *et al.*, 2007b).

Due to my limited PhD research budget, the field work for this thesis was conducted only at two sites of the community-company partnership scheme, in Jambi and West Kalimantan, as these sites had the longest-standing data sets. Updated information were gathered through communication with local stakeholders, and from secondary sources through desk research (see Section 3.4 Chapter 3).

The research questions identified above guide the scope of the four stages of the analysis in this thesis (Figure 1-1): (1) Analysing the socioeconomic performance and relative advantages of small-scale commercial tree-growing strategies; (2) Comparing the socioeconomic performance and relative advantages of small-scale commercial tree-growing strategies with alternatives that use similar resources; (3) Analysing the relative advantages of small-scale commercial tree-growing strategies in seeking policy options for promoting them; and (4) Analysing the potential contribution to the national wood production strategies.

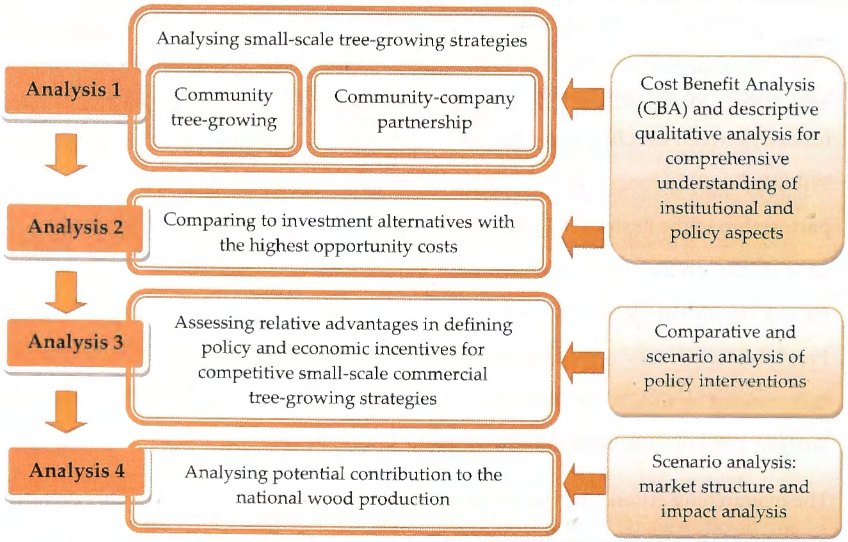


Figure 1-1. Stages and foci of analysis, and methods used

As further described in Chapter 3, the overarching methodology in this thesis is comparative analysis, using both quantitative and qualitative methods, based on a case study approach. Descriptive qualitative analysis is used to analyse the institutional, tenurial and management arrangements, and the overarching policy framework. Quantitative analysis was conducted using Cost Benefit Analysis (CBA). Descriptive qualitative analysis also enriches the quantitative analysis by providing more in-depth explanations to the results. These methods are the main means for conducting analyses (1) and (2). The results from the comparative analysis based on case studies provide the basis for scenario analyses at the national level. Specifically, the analysis looks at to what extent, and under what conditions, wood from small-scale tree-growing within and outside state forests can potentially contribute to meeting the wood demand. This takes into account wood industry characteristics and the degraded area, where small-scale tree-growing can be developed. Therefore, scenario analysis is the main method for executing the analyses of (3) and (4).

1.5. Structure of the thesis

The thesis is structured in eight chapters organised as follows:

Chapter 1 is the introductory chapter and presents the research context by discussing the background and issues within the global and Indonesian contexts. Identified research problems, research questions, summary of conceptual framework and research design are also presented.

Chapter 2 describes the hybrid conceptual framework that brings together elements of research and overarching theories used as part of the conceptual framework.

Chapter 3 presents the research design. In this chapter, scope of analysis and methodology used are described, including the overview of case studies.

Chapter 4 presents results from the analysis based on case studies on community tree-growing schemes in the Districts of Sumbawa and Bima of West Nusa Tenggara. Specifically, it presents the results under specific socioeconomic, institutional and policy settings for small-scale tree-growing for commercial competitiveness.

Chapter 5 presents the results from a similar analysis to those discussed in Chapter 4, but focussing on the community-company partnership scheme based on cases in Jambi and Sanggau (West Kalimantan).

Chapter 6 presents the results from the analysis in looking at the relative advantages of the two strategies discussed in Chapters 4 and 5; and scenario analysis on policy and economic incentives for promoting small-scale commercial tree-growing strategies.

Chapter 7 presents the discussion on the role of timber production from small-scale tree-growing in complementing national wood supply.

Chapter 8 concludes the thesis, focussing on the main findings, drawing implications from the findings in making recommendations for future research and action in relation to the topic of the research.

Chapter 2. Conceptual framework for analysing strategies to enhance commercial tree growing in Indonesia

> *A conceptual framework is simply a set of definitions which specify what is to be observed: when relevant hypotheses have been empirically interpreted and included in the framework, theory has been produced, and can be used to explain a relationship that exists* (Kalleberg, 1966).

2.1. Introduction

The objective of this chapter is to present the conceptual framework underlying the research analysis adopted in this thesis. First, it presents an overview of the conceptual framework and the theories used in the theoretical framework (Section 2.3). The following sections then give further detail on each component under two main sections: the feasible management of small-scale commercial tree-growing (Section 2.4) and favourable conditions for small-scale tree-growing to be more commercially competitive (Section 2.5). However, at the beginning, it is important to understand the key drivers for the emergence of small-scale tree-growing (Section 2.2).

Small-scale tree-growing in this thesis is defined as the management of stands of trees as common or individual property, or a combination of both possibly through a collective body, with the aim of using monoculture or inter-cropping techniques to achieve multiple objectives, including the sharing of the economic benefits (Arnold, 2001b; Harrison and Suh, 2004; Snelder and Lasco, 2008). Specifically, in the context of agroforestry practices in Asia, tree growers are referred to as the households which: (1) own, or at least control or have access over, either individually or shared collectively, parcels of farm and forest land totalling from less than 1.0 ha up to a few hundred hectares; and (2) have planted trees on these lands, including species that have been planted and/or those that have been protected after having established themselves spontaneously from wild seedlings (Tjitrosemito and Soerjani, 1991; Snelder and Lasco, 2008). Tree-growing can also be integrated with livestock or fish farming (Nair, 1989); however, this combination is beyond the scope of this thesis.

Small-scale commercial tree-growing, which is the focus in this thesis, is the subset of those growers who have already adopted small-scale tree-growing in their livelihood strategy, and who aim eventually for commercial production to get the most favourable socioeconomic benefits possible, in comparison to other economic alternatives using the same resources of land and other outlays (e.g. capital, labour). The main underlying assumption of small-scale commercial tree-growing management is that smallholders are rational decision-makers who are interested in change (Godoy, 1992b).

2.2. The key drivers for the emergence of small-scale tree-growing

There are several key drivers encouraging small-scale tree-growing to become an option in forestry management strategies, especially as part of forest-based development. The inter-related drivers can be categorised into five groups, as described in the following paragraph (Arnold, 1997a; Arnold, 2001b; Angelsen and Wunder, 2003; Harrison and Suh, 2004; Scherr, 2004; Herbohn, 2006 ; Bliss and Kelly, 2008; Snelder and Lasco, 2008; Atindogbe *et al.*, 2012; Macqueen, 2013; Harada and Wiyono, 2014).

1. Greater community access and ownership, including by tree growers, of forest areas and certain commercially valuable forest resources due to:

(i) Devolution and decentralisation as part of the transformation in the governance of forest management;

(ii) More democratic governance in response to national and international campaigns by intergovernmental agencies and NGOs for good governance and stronger support for indigenous land rights;

(iii) Some governments, mainly in tropical forest-rich countries, providing communities with access to become involved in small-scale tree-growing as part of a solution to reduce conflicts over the expansion of commercial large-scale monocultures of fast-growing trees, for example in Thailand and Indonesia.

2. The need to balance conservation and development objectives within a sustainable forest management framework:

(i) Small-scale tree-growing is used as the technique under the reforestation programme to maintain the land productivity in the face of declining soil quality, for example in former logging areas, since small-scale plantations are assumed to be more ecologically and socioeconomically acceptable than the large-scale ones (see point 5);

(ii) Extensive tree-growing and commercialisation on small farms through farming into marginal lands, tree domestication and out-grower arrangements, which are used as approaches for forest intensification. This is also often stimulated by new planting and processing technologies that become accessible to the smallholders when brought in by a community partner, for example by a company under the out-grower scheme;

(iii) Small-scale tree-growing is also used by governments, mainly in Asian countries, to overcome shifting cultivation problems with the expectation that they can be stopped or at least stabilised, for example in Laos and Vietnam.

3. Risk management strategy, from the perspective of both tree-grower households and government or state-owned/ private companies:

(i) From the tree-grower household perspective: in response to the dynamic socioeconomic pressures, households often use tree-growing as one of their risk management strategies to secure the right of tenure and access to land, and as a buffer to deal with the seasonal conditions affecting the cash crops, labour opportunity, and options in providing security for their livelihoods by using trees as savings;

(ii) From the government or state-owned/private company perspective: involving the community directly and indirectly in tree-growing could minimise the operational costs and reduce risk caused by social resentment over tenurial conflicts.

4. In responding to the emerging markets that are also stimulated by several of the conditions mentioned before (mainly points 1 and 2):

(i) The expanding wood market in developing countries, particularly the high-volume market for low-grade construction timber;

(ii) The certified-product market produced for the ecologically and socially responsible markets (e.g. in Europe and USA)—this is driven by the initiatives taken to use the market to drive the direction of sustainable forest management;

(iii) The market under Payment for Environmental Services (PES) schemes;

(iv) The market from wood-based processing companies, mainly in developing countries (e.g. pulp and paper), facing limited opportunities for the expansion of their plantations;

(v) New opportunities from globalising markets that create opportunities for non-traditional suppliers from buyers (beyond the country boundaries) who are proactive in seeking and securing reliable sources of scarce commodities.

5. Other comparatively advantageous characteristics in comparison to industrial forest companies:

(i) The lower cost structure, which may be true in certain conditional cases. For example, this may be due to the lower opportunity costs for land and labour, or to lower production costs from inter-cropping, in comparison to the total returns;

(ii) Flexibility and low management intensity due to relatively flat organisational structures (under cooperatives) or to individually managed farm businesses, in comparison to large-scale management style;

(iii) Better monitoring and protection due to relatively manageable small-scale areas and the strong socio-cultural attachment of the tree growers, who can provide more intensive monitoring and protection from encroachment and illegal logging, for example;

(iv) Greater social acceptability by the wider society in comparison to the acceptability of commercial industrial forestry.

All the opportunities discussed above also come with some caveats. For example, globalisation through trade liberalisation may have negative impacts on local growers, as a result of competition with cheaper imported wood coming from overseas producers, for example in Mexico (Jaffee, 1995; Bray and Merino-Perez, 2002). There are serious challenges in practice in translating these opportunities into policy and socioeconomic incentives that can benefit the development of small-scale tree-growing (Nawir and Santoso, 2005; Nawir and ComForLink, 2007; Hoch *et al.*, 2012; Auer, 2012; Perdana *et al.*, 2012; Nawir, 2012; Duguma, 2013; Nawir, 2013; Harada and Wiyono, 2014).

2.3. Overview of conceptual framework and relevant theories as the theoretical framework

Guided by the research questions mentioned in Chapter 1, this section provides an interpretation of the conceptual framework used in addressing these questions (Figure 2-1). Two main components lie at the centre of this discussion: the conditions necessary for socioeconomically feasible management; and the most favourable conditions for small-scale tree-growing to be more commercially competitive.

The conditions for socioeconomically feasible management are determined by: motivating factors and tree-growing objectives; the endowment characteristics of small-scale tree-growing management; the market structure and access to markets; and institutional and policy conditions. The diagram also shows the framework of levelling incentives that address the challenges, as required to provide favourable conditions for small-scale tree-growing to be more commercially competitive, which leads to feasible commercial tree-growing. In this thesis, feasible refers to socioeconomically feasible management, which takes into account both social and financial aspects (see also Section 3.3.3 in Chapter 3).

The first component comprises five inter-related and overlapping applications of the theoretical framework: the theory of five capitals as part of Sustainable Livelihood Framework; the theory of optimal economic allocation of forestry resources; the theory of the forest tenure system and bundles of property rights; and the theory of market structure that includes the theory of market and policy failures. For the second component, the theory of applying policy instruments in forestry resource management provides the theoretical framework for analysing the most favourable conditions for small-scale tree-growing to be more commercially competitive. The application of these components recognises that an overlap in the application of these theoretical frameworks does exist, particularly in addressing more than one research question.

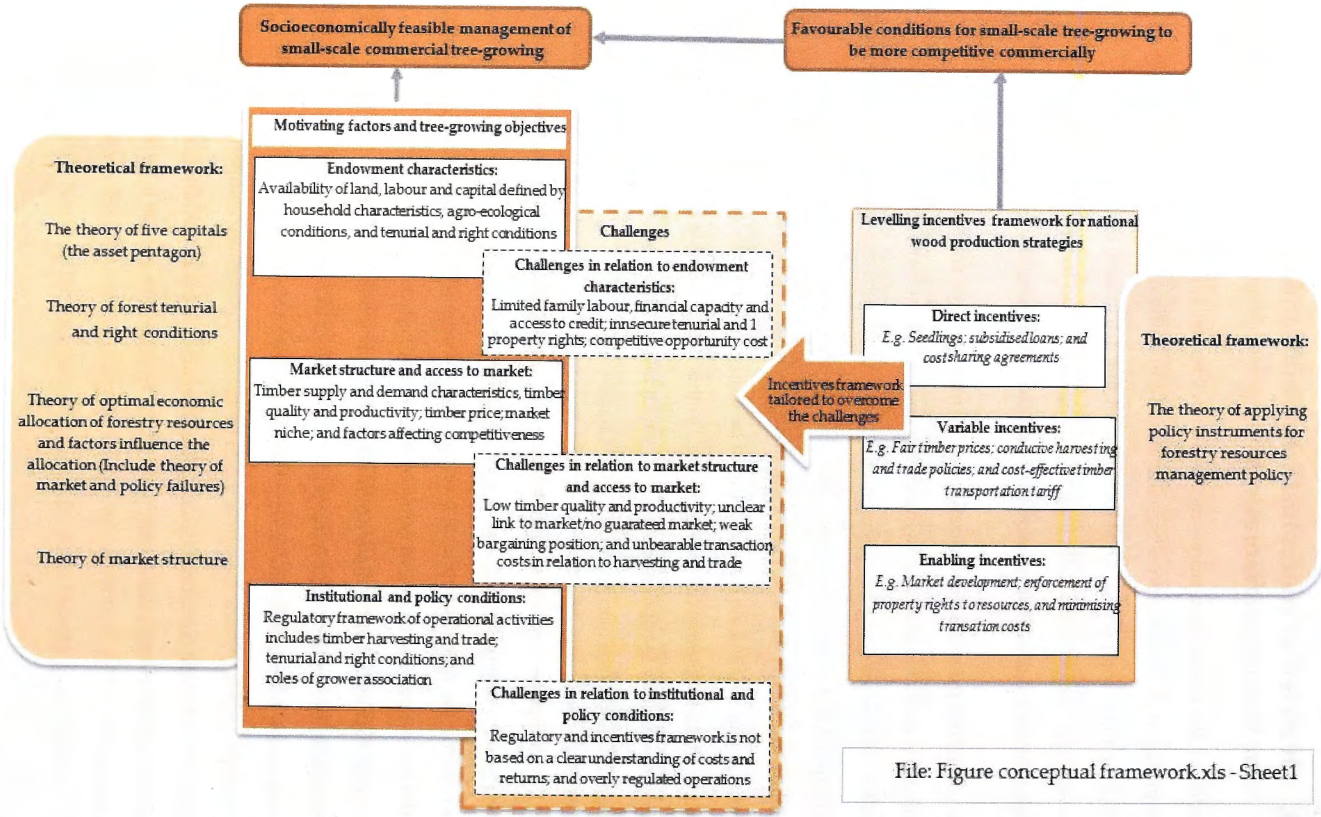


Figure 2-1. Conceptual framework in enhancing strategies for small-scale commercial tree-growing inside state forests in Indonesia

The use of the first theory, the five capitals (the asset pentagon) concept is justified by the fact that tree-growing has become an important part of household livelihood strategies, for example, for savings purposes (Godoy, 1992b; Meijerink, 1997; Perdana *et al.*, 2012; Sabastian *et al.*, 2014). Therefore, wood production strategies practised by small-scale tree growers depend on the availability and the status of a household's capital, i.e. human, natural, financial, social and physical (Raintree, 1991; DFID, 1999; Duguma, 2013). See Section 2.4.1 for further discussions.

The second theory relates to the optimal socioeconomic allocation of forestry resources as part of a welfare economics framework (Perman *et al.*, 1996; Sagoff, 2000). Welfare economics is a methodological approach for analysing the conditions required for optimal resource allocation and establishing principles for government intervention to ensure that general welfare conditions can be met (Pearse, 1990; Zilberman, 2007).

The use of the theory on optimal socioeconomic allocation of forestry resources in this thesis is justified due to the fact that small-scale tree growers also deal with scarce forestry resources, in a similar way to other investments involving natural resources (Telser, 1988; Pearse, 1990; Armentano, 1992; Perman *et al.*, 1996). This theory thus provides a framework for analysing whether small-scale tree-growing is able to compete commercially with other investment options using similar resources by meeting the socioeconomic conditions for efficient and optimal allocation of resources (Pearse, 1990; Perman *et al.*, 1996; Klemperer, 1996). The application of this theory is discussed further in Section 2.4.2. With some overlap in its applications, the first and second theoretical frameworks mentioned earlier underlie the analysis undertaken in addressing research questions 1 and 2.

Closely linked to the second theory, the third theory focuses on the theory of market characteristics for timber production (Pearse, 1990; Klemperer, 1996; Harrison, 2005). Due to the nature of long-term investment in forestry, in most cases small-scale tree growers have to deal with market failure conditions that occur under imperfect market structures, such as oligopsony, in which there are limited numbers of buyers (Pearse, 1990; Klemperer, 1996). Market failure reflects a situation in which a free market mechanism is prevented from achieving optimum welfare conditions (Klemperer, 1996). By understanding different possible causes for market failures that small-scale commercial tree-growers are specifically facing, proposed strategies for a levelling incentives framework can be analysed and recommended (Pearse, 1990; Klemperer, 1996; Harrison, 2005). This is the theoretical framework underlying the analysis undertaken principally to address research questions 3 and 4 as discussed mainly in Chapter 6 and Chapter 7, but it is also very useful in addressing the first two research questions. The application of this theory is discussed further in Section 2.4.3.

The fourth theory, the institutional framework for successful community-based, small-scale commercial tree-growing management, is useful in looking at the overall institutional framework that is conducive to feasible management (Scherr *et al.*, 2003; Dunning, 2007). The use of this framework is justified, since economic considerations are not the only factors that are essential in small-scale commercial tree-growing management (Dewees and Saxena, 1997a; Snelder and Lasco, 2008).

As part of the institutional framework, the most important theory is the concept of the forest tenure system and of the associated property rights. This is justified by the fact that small-scale tree-growing is carried out under different systems of property rights in relation to the people's main capital, land (Thapa *et al.*, 1991; Dewees and Saxena, 1997a; Warner, 1997; Scherr *et al.*, 2003; Snelder and Lasco, 2008). This theoretical framework mainly underlies the analysis addressing research questions 1 and 2 (as discussed in Chapters 4, 5, and 6). The applications of this theory are discussed further in Section 2.4.4.1.

Lastly, the analysis applies a policy instrument framework to forestry resource management as the theoretical framework for analysing the conditions that are favourable for small-scale tree-growing to be more commercially competitive (Meijerink, 1997; Antinori and Bray, 2005; Dunning, 2007). This policy framework is mainly applied by creating a 'levelling incentives' framework that is tailored specifically to address the challenges that are set in providing favourable conditions for small-scale tree-growing to be more commercially competitive, which eventually leads to the feasibility of small-scale commercial tree-growing (Meijerink, 1997; Enters *et al.*, 2004). This theoretical framework is underlies the analysis undertaken principally to address research questions 3 and 4 as discussed in Chapters 6 and 7. This framework is further discussed in Section 2.5.

2.4. Socioeconomically feasible management of small-scale commercial tree-growing

This section focuses on the underlying factors affecting small-scale commercial tree-growing and includes a discussion on the necessity of having a better understanding of current challenges to feasible tree-growing management. A clear understanding of the five capitals concept provides a basis for analysing the advantages and disadvantages of different small-scale commercial tree-growing strategies, including associated potential risks, and the results of this analysis are important in improving the feasibility of tree-growing. Feasible enterprise development is important as the basis for community forest management, such as small-scale tree-growing, so that communities can work themselves out of poverty (Mbile *et al.*, 2007; Nawir, 2012). This theoretical framework sheds light on the discussion in the next four sections: household capital in small-scale tree-growing; market access for small-scale commercial tree-growing; institutional and policy conditions that influence the feasibility of small-scale commercial tree-growing; and the implications of an ineffective regulatory framework for small-scale commercial tree-growing.

2.4.1. The concept of household capital in small-scale tree-growing: motivating factors, tree-growing objectives and endowment characteristics

Referring to the five capitals concept of Sustainable Livelihood Framework,[7] the discussion in this section focuses on motivating factors, tree-growing objectives and endowment characteristics, as well as on the implication of endowment characteristics for the level of management intensity. The section first discusses the five capitals concept, here defined as endowment factors for small-scale tree-growing. The five forms of capital as part of sustainable livelihoods in relation to small-scale commercial tree-growing are as follows (Carney *et al.*, 1999; DFID, 1999; Warner, 2002):

---

[7] For more detailed discussion on the framework, see for example DFID (1999).

1. Natural capital refers to natural resources such as land and forests in relation to small-scale commercial tree-growing. This capital is defined by agro-ecological conditions;
2. Physical capital refers to privately owned assets that can be used to increase labour and land productivity. This capital also refers to publicly owned economic and social infrastructure, such as roads that are built by the state or private companies;
3. Financial capital means there is cash coming from income and/or savings, and this cash can be used instantly as capital if and when necessary;
4. Human capital is related to educational standards and skills and often defines the motivation behind any economic decision;
5. Social capital refers to the set of social relationships on which people can draw to expand livelihood options. The most relevant ones in the case of small-scale tree-growing, for example, are memberships of formal groups and partnership contracts that provide loans, grants and other forms of insurance (see Section 2.4.1.2).

Referring to these five components of household capital, this section discusses the motivating factors, and how the endowment factor influences the level of management intensity in small-scale tree-growing.

2.4.1.1. Motivating factors and endowment characteristics

The decision to grow trees commercially is driven by various factors that can be categorised as economic, socio-cultural, and ecological (Raintree, 1991; Godoy, 1992b; Meijerink, 1997). There are five economic reasons. The first is the need for self-sufficiency to meet basic needs for fuel, fodder and timber; this is mainly driven by the scarcity of these products from natural forests (Thapa *et al.*, 1991; Scherr, 1995; Dewees, 1997; Gilmour, 1997; Arnold, 2001b; Duguma, 2013). Secondly, tree-growing is part of a household management strategy to use trees as accumulated assets as part of the household savings (Chambers and Leach, 1987; Godoy, 1992b; Arnold, 2001b). Thirdly, alternative sources of incomes are lacking at the local level (Scherr, 1997). The fourth reason is that tree-planting is encouraged by external incentives, such as the existence of a local wood market that offers attractive returns (Nawir, 2000; Simmons *et al.*, 2002; Scherr, 2004; Perdana *et al.*, 2012; Sabastian *et al.*, 2014). In this situation, the variability of the timber price further defines the decision to grow trees (Predo, 2003; Atindogbe *et al.*, 2012). Lastly, the four aforementioned reasons are not realistic without the availability of land, labour and capital resources being owned by tree growers in the first place, as these are the most important endowment factors (Meijerink, 1997; Nawir, 2013). The same factors influence also the level of intensity, which involves either more subsistence-oriented or commercially oriented activities in line with each household's economic orientation (Godoy, 1992b; Meijerink, 1997; Emtage, 2004; Nawir, 2013).

Results from a study in the Philippines suggest that among those who are interested in small-scale commercial tree-growing (60% of responding households in the survey), the decision in favour of more commercially oriented management relates to several factors, such as those households who own more parcels of land and the location of these lands at a distance from the village (Emtage, 2004; Predo and Francisco, 2008). Further, those households who have been involved in community forestry training and have been members of a community organisation are more likely to be interested in planting timber trees for commercial purposes. Those who know how to deal with tree registration procedures as part of the requirements in planting and harvesting the timber are also more likely to plant commercial timber (Emtage, 2004).

Based on land availability, categories of tree-grower groups include: the advantaged, the moderately endowed, and the disadvantaged (Table 2-1). The advantaged group comprises the wealthiest community members who have more than enough land and other resources to plant trees, compared with the disadvantaged group who depend on a land allocation programme that might be part of a reforestation programme (Raintree, 1991). It is likely that the advantaged group is characterised by more endowment factors to expand tree-growing activities as market opportunities arise.

Table 2-1. Categories of tree growers based on land availability

Category	Landholding	Capacity to participate in tree-growing
1. Advantaged	Large farmers	More than enough resources for tree planting practices, this group is interested if tree planting offers attractive commercial returns, or other socioeconomic benefits (e.g. security of tenure over larger land holdings)
2. Moderately endowed or capable	Small to medium scale farmers	Enough resources for participation in various tree planting practices, both for subsistence and commercial purposes; this is the main participant group in a vast range of agroforestry and other multipurpose tree planting practices
3. Disadvantaged	Landless and marginal farmers, minority groups, women in some cases, etc	Inadequate land resources limit participation in tree planting for limited purposes (for cash income or partial subsistence); often specific incentives and infrastructural supports are provided for their participation, e.g. through land allocation and tree tenure rights

Source: Raintree (1991).

Some socio-cultural issues also influence community initiatives in tree-growing. Communities that practise shifting cultivation commonly use specific trees as a means to claim land (Godoy, 1992a; Colfer and Dudley, 1993; Warner, 1997; Nawir *et al.*, 2003b; Reyes-Garcia *et al.*, 2012). Tree-growing can be a part of traditional practices, in which some species have important traditional value to some tribes, such as the Dayak communities in Indonesia (Colfer and Dudley, 1993). Tree-growing can also be institutionalised to become common practice among communities in order to maintain the sustainability of their farm forestry practices, for example the obligation for a newly-wed couple to plant trees as part of their wedding ceremony in *Gunung Kidul,Yogyakarta,* Indonesia (Nawir *et al.*, 2007g).

Ecologically related reasons have also motivated some communities to plant trees: for example, to control soil erosion, for use as a windbreak or shelter, for shade, water absorption/retention or to improve drainage (Raintree, 1991; Nawir *et al.*, 2007g; Schuren and Snelder, 2008). However, it is important to recognise that tree planting cannot compensate for biodiversity losses as a result of the impact of the initial deforestation of primary tropical forest (Simmons *et al.*, 2002).

Other reasons that might have influenced the adoption of tree planting include the presence of external support, for example through experiences gained by participating in training or forestry projects, as well as by being part of extension programmes conducted by government and non-government organisations that included seedling dispersal, environmental education, technological knowledge-sharing and awareness-raising about timber (Simmons *et al.*, 2002; Emtage, 2004; Schuren and Snelder, 2008; Sabastian *et al.*, 2014). Under present conditions, economic motivations play a major role in tree adoption compared to other factors, such as socio-cultural or ecological aspects (Godoy, 1992b; Simmons *et al.*, 2002; Predo, 2003; Nawir *et al.*, 2003b; Enters *et al.*, 2004; Schuren and Snelder, 2008; Sabastian *et al.*, 2014).

2.4.1.2. The level of management intensity according to endowment characteristics

Endowment factors defining the level of management intensity in tree planting include household characteristics, agro-ecological conditions and the status of tenurial rights over the land where the trees grow (Table 2-2) (Raintree, 1991; Scherr, 1997; Warner, 1997). Agro-ecological conditions, such as climatic conditions, influence species selection and planting purposes, such as windbreaks that are more common in the dry zone (e.g. in most African regions), where problems caused by damaging winds are found (Scherr, 1997; Warner, 1997).

Household characteristics are defined by farm size, socioeconomic status, the gender of the head of household and the household demographic cycle. Larger farms are more likely to include more trees in the free spaces available, in contrast to smaller farms that tend to prioritise cash crops (Raintree, 1991; Scherr, 1997). The choice of type of investment for tree planting depends on the level of socioeconomic status: fuel-wood is more common among the poor, while the wealthiest prefer to plant timber for other purposes, such as fencing, while average households tend to combine various types of tree-growing (diversification), such as fruit trees and timber (Raintree, 1991; Dewees, 1997). Also, tree planting is more common among households with a male head and/or with women in the house while the husband is away from the family, compared to families with no male in the family (Scherr, 1997). Tree planting is also common among older families (with less family labour) compared to young families, since tree planting is a less labour-intensive activity (Scherr, 1997).

The link between trees and security of tenure as one of the most important determining factors in making a decision to plant trees among communities was highlighted in the early 1980s, and this issue has generated wider in-depth analysis (Fortman, 1985; Byron, 1995; Reyes-Garcia *et al.*, 2012). It is understood that bundles of rights under tree tenure include the right to own or inherit, the right to plant, the right to use and the right of disposal, which can be held by different people at different times (Fortman, 1985; Raintree, 1991). Such bundles of rights can be possessed by different categories of rights holders: land owner, usufruct right holder, tenant, borrower, farm labourer and squatter (Raintree, 1991). Further, the conditions attached to tenure and rights conditions define the level of management intensity in tree-growing, within the range from subsistence to commercially oriented tree-growing (Warner, 1997; Simmons *et al.*, 2002; Emtage, 2004). Lack of secure tenure conditions is the main constraint for the poorest groups in the communities, since their lands are usually allocated to them under a particular tree-planting project, in which long-term access, e.g. for harvesting, becomes the main issue (Angelsen and Wunder, 2003; Vedeld *et al.*, 2004; Nawir *et al.*, 2007a). This is discussed further in Section 2.4.4.

Despite much research on the physical and biophysical aspects of smallholder tree-growing as a basis for advancing the technical performance in tree-growing (e.g. Bertomeu and Gimenez, 2006; Bertomeu, 2012), improving the timber quality and productivity has long been an unresolved issue, mainly in developing countries (Current *et al.*, 1995; Antinori and Bray, 2005; Montambault and Alavapati, 2005; Noordwijk *et al.*, 2008; Roshetko *et al.*, 2008). Specifically, the problems relate to the availability of high-quality planting materials at reasonable cost at the tree-grower level and to delivering any technical interventions to address problems in providing appropriate extension services by the forestry agencies (Anyonge and Roshetko, 2003; Noordwijk *et al.*, 2008; Roshetko *et al.*, 2008; Atindogbe *et al.*, 2012).

Table 2-2. Endowment characteristics of tree grower households

Categories		Tree-grower types
1. Household characteristics	Farm size (size of landholding)	Medium-large
		Small farmers
	Socioeconomic status	Wealthy, middle-class, and poor
	Household demographic cycle	Young families with productive age family labour, in contrast to older families with less productive family labour
2. Agro-ecological conditions	Climatic conditions influence species selection	Tree-growing in tropical, temperate and dry zones
3. Tenurial and right conditions [a]	Land owner	Freeholder, owner operator, absentee landowner, etc
	Usufruct right holder	Tenure usually secure but rights limited
	Tenant	All forms of rent, lease, or sharecropping
	Borrower	Based on informal reciprocity rather than formal exchange
	Farm labourer	Full or part-time, continuous or temporary
	Squatter	'Illegal' occupier but some rights usually recognised

a. Further discussed in Section 2.4.4.
Sources: Adapted from Raintree (1991); Dewees and Saxena (1997a); Nawir *et al.* (2003b); Nawir and ComForLink (2007); Suwarno *et al.* (2009).

One of the most common types of current social capital in relation to small-scale commercial tree-growing is the case of the relationships under collaborative management (co-management) arrangements (Mayers, 2000; Arnold, 2001b; Angelsen and Wunder, 2003; Nawir *et al.*, 2007c). Collaborative management (co-management) is defined as:

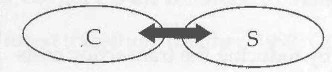
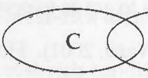
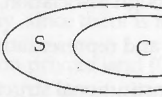
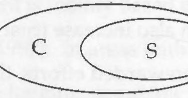
> *The sharing responsibilities, rights and duties between the primary stakeholders, in particular, local communities and the nation state; a decentralised approach to decision making that involves the local users in the decision making process as equals with the nation state* (World Bank, 1998).

Carlsson and Berkes (2005) identify four possible institutional collaborative arrangements that can occur between the two general groups of stakeholders—state (S) and community (C)—that can be applied in the case of small-scale tree-growing. However, it is acknowledged that both S and C take into account a rich diversity of institutions and divisions. For example, the private sector is included as part of the community of resource users, and S includes the local, regional and central public authorities (Carlsson and Berkes, 2005). However, the private sector also has a role, for example if the private company receives concession rights from S and develops any form of collaboration with communities (Mayers and Vermeulen, 2002; Nawir and Santoso, 2005). As illustrated in Table 2-3, the detailed descriptions of four possible institutional collaborative arrangements are as follows:

1. Collaborative management as an exchange system: S and C are treated as two separate spheres, and co-management between these two spheres is characterised by including the exchange of information, goods and services.
2. Collaborative management as joint organisation: There are some overlapping sectors between S and C, with each sector maintaining its authority and relative autonomy. Co-management is characterised by the establishment of a formalised forum for cooperation, e.g. joint management cooperative.
3. Collaborative management as a state-nested system: Co-management is characterised by a situation where S is the de facto holder of all the legal rights in a certain area or a particular resource system, and C has been granted the right to manage the state-owned resources. C has a significant degree of independence in managing the resources through the organisational unit that is formed.
4. Collaborative management as a community-nested system: as the opposite of type 3 above, co-management is characterised by C having all legal rights over a particular resource system and S managing within this 'non-public' sphere. However, S can still apply some restrictions to the management of these resources.

Amongst the four types, the state-nested system is the most common (Carlsson and Berkes, 2005). However, the state commonly holds permanent legal rights over the most essential natural resources involved in the local community's livelihoods, such as forests. Some common examples include the Community-Based Forest Management Program (CBFMP) in the Philippines, the Joint Forest Management (JFM) scheme in India, and the Communal Areas Programme for the Management of Indigenous Resources (CAMPFIRE) Program (Calderon and Nawir, 2004; Matose, 2006; TERI, Undated). This is also true for other cases included in this thesis, namely the community tree-growing and community-company partnership schemes that are based on the collaborative arrangement under a state-nested system. The application of this theory in this thesis is discussed in Section 6.2.2.1 (Chapter 6).

Table 2-3. Social capital for small-scale commercial tree-growing: four types of collaborative institutional arrangements between C (community) and S (state)

Institutional arrangement between community and state		Description
1.		Collaborative management as an exchange system
2.		Collaborative management as joint organisation
3.		Collaborative management as a State-nested system
4.		Collaborative management as a community-nested system

Source: Carlsson and Berkes (2005).

The Mexican example (*Ejidos*), discussed by Antinori and Bray (2005) in their paper, suggests that the transformation is possible, in this case from a type 3 state-nested system to another type of co-management system, particularly type 1 (co-management as an exchange system). The transformation is possible mainly due to the changes in policy for agrarian reform, in the case of Mexico, or a decentralisation policy in favour of devolution of power from state to local community, as in the Philippines and Indonesia (Antinori and Bray, 2005; Guess, 2005; Fujiwara *et al.*, 2012). Increasingly, due to dynamic changes locally and globally, collaborative management has devolved into various forms of collaboration/partnership arrangements that involve multi-parties or stakeholders (IUCN, 1996; World Bank, 1998; Wollenberg *et al.*, 2004).

The roles social capital plays in enhancing livelihoods are important, since rural community members with greater access to social capital have higher incomes (Cleaver, 2005). Further, in the broader scope, claims have been made for social capital to be considered the 'missing link' between states and markets in the development processes (Cleaver, 2005). Social and human capital is also fundamental to improving natural capital and finding solutions to local development problems (Pretty and Ward, 2001). Four central aspects of social capital are important and effective in improving natural resources management and enhancing local livelihoods (Pretty and Ward, 2001): (i) relations of trust; (ii) exchanges; (iii) common rules, norms and sanctions; and (iv) connectedness, networks and groups.

The first aspect, trust, facilitates collaboration by reducing the transaction costs between people, such as individuals being able to trust others to act as expected, instead of having to invest in monitoring others (Pretty and Ward, 2001). However, social capital is not created without human intervention through association, while trust does not instantly emerge from recurring interactions, and representation of the very poor is difficult to secure even through decentralised institutional structures (Cleaver, 2005). Secondly, exchanges such as information also increase trust and, although at any given time they may be considered as unrewarded efforts, they are beneficial (Pretty and Ward, 2001) in the long run. Thirdly, common rules, norms and sanctions are mutually agreed, and place group interests above those of individuals; for example, mutually-agreed sanctions ensure that those who break the rules know they will be punished (Pretty and Ward, 2001). Fourthly, the connectedness, networks and groups, and the nature of relationships are a vital aspect of social capital (Pretty and Ward, 2001). These could refer to many different types of connection between groups (trading of goods, exchange of information, mutual help, provision of loans, common celebrations) which are subject to regular review to be able to respond to current conditions (Cleaver, 2005). In addition to the aforementioned four aspects, the formation of social capital cannot work without thoughtful consideration of the disadvantages of the poor and the constraints on the agency representing them (Cleaver, 2005).

2.4.1.3. The level of management intensity according to forest conditions and the population level

There are two extreme conditions resulting from combined aspects of forest condition and population level that may define the tree growing patterns: first is the condition of forest-rich areas and low population, and second is the condition of forest-deprived areas and high population (Gilmour, 1997; Arnold, 2001b; Snelder and Lasco, 2008) . Another category is the condition in transition between these two extremes—the so-called 'forest transition' (Mather, 1992; Gilmour, 1997; Snelder and Lasco, 2008).

2.4.1.3.1. Forest-rich areas and low population

With the forest-rich condition, tree management is practiced but primarily in a rather passive way, since there is not much interest in forest protection or tree planting in the forests, or on private land (Gilmour, 1997; Snelder and Lasco, 2008). Forest management is mainly based on indigenous systems with restricted user rights only (Gilmour, 1997). In areas with more intensive forest-based exploration activities, such as selective logging, some tree species are replaced with other valuable trees in enrichment planting (Gilmour, 1997; Snelder and Lasco, 2008). Other tree development approaches include: swidden system, agroforest, village forest, taungya system, and rubber/tea forests (Snelder and Lasco, 2008). For example, in LAO PDR, traditional tree-growing practices have been implemented as part of rice-based swidden systems in upland areas managed by multiple ethnic minority groups (Snelder and Lasco, 2008).

2.4.1.3.2. Forest-deprived areas and high population

At the other extreme is the tree growing situation in the forest-deprived areas with very dense population (Gilmour, 1997; Snelder and Lasco, 2008). In these areas, usually natural forests have been largely cleared, and trees are planted intensively on ex-forest areas and/or on private lands (e.g. home gardens) (Arnold, 2001b; Snelder and Lasco, 2008). Tree planting practices are also employed as a low-cost means of using poor sites, or to maintain land as extensively managed fallow (Arnold, 1997a). However, in these areas, pressures from competing land uses for other crops with higher market values are very intense, and tree planting can be pushed out as an option for cultivating practices and may cause tree growers to move out of these areas, particularly after experiencing a severe decline in crop yields due to ongoing degradation (Dewees, 1997; Scherr, 1997; Noordwijk *et al.*, 2008). Examples include cases in the Philippines, Indonesia, and India, where trees are established on farms and field boundaries through inter-cropping and line planting on *imperata* grassland (Snelder and Lasco, 2008). In these areas, market infrastructure and opportunities are likely to be quite extensive due to well-developed markets for agriculture crops (Gilmour, 1997).

2.4.1.3.3. *Tree-growing in the areas that are in transition between the two extreme conditions of 'forest-rich areas and low population' and 'forest-deprived areas and high population'*

Where forests are becoming more depleted or access is restricted, there is a growing interest in forest development activities (Mather, 1992; Gilmour, 1997). As the conditions become more severe in terms of forest product shortages, the forest development activities through extensive tree planting are becoming more significant (Gilmour, 1997; Snelder and Lasco, 2008). However, forest product shortages, such as the case of fuel-wood, can be differentiated into physical or economic scarcity (Dewees, 1997). Physical scarcity refers to whether resources are physically present or absent; and economic scarcity refers to the ability of a household to allocate its land, labour and capital resources in a way which enables it to actually use the existing resources (Dewees, 1997). A resource which is physically scarce may not be economically so, and vice versa (Dewees, 1997). In this case, opportunity costs for tree planting using timber species are usually quite high, such as benefits coming from oil palm plantations (Nawir *et al.*, 2003b; McCarthy *et al.*, 2012; Obidzinski *et al.*, 2014).

The objectives of tree-growing in these areas can be either for market and ecological purposes, or even both (Snelder and Lasco, 2008). Tree-planting practices are: tree boundaries, roadside trees, inter-cropping, home gardens, and tree plantations (Snelder and Lasco, 2008). In this area, the landscape is gradually converting from natural forests into agroforests, or trees on farms into agroforests, such as in Lao PDR and Indonesia (Snelder and Lasco, 2008).

The most common technique for community tree planting, under either communal or private management, is through agroforestry systems, which are the most widespread of small-scale tree-planting arrangements (Long and Nair, 1999; Snelder and Lasco, 2008). The term agroforestry is often used interchangeably with farm forestry, such as in South and Southeast Asia (Long and Nair, 1999). Agroforestry refers to a type of land use in which trees and other woody perennials are grown in combination with seasonal crops, such as fruit trees, or with livestock, or both, in such a way that the benefits of the overall system are created from the mutual economic and ecological interactions among the different components (Nair, 1989; Nair, 1990; Harrison *et al.*, 2002; Snelder and Lasco, 2008).

Inter-cropping between timber and other agricultural crops (usually in between timber trees) is quite a common technique practiced by smallholders (Snelder and Lasco, 2008; Schuren and Snelder, 2008; Predo and Francisco, 2008; Bertomeu, 2012). However, in farm forestry, tree planting can also be developed as a monoculture, such as on arable land or farm woodlots (Arnold, 1997a; Long and Nair, 1999). Other patterns of planted trees include: trees on non-arable or fallow (uncultivated) land; trees grown in homestead areas; and tree-growing along boundaries and in other lines (Arnold, 1997a). For extensive discussions on different techniques and silvicultural practices see, for example, Roshetko *et al.* (2007), Predo and Francisco (2008), Snelder and Lasco (2008), Schuren and Snelder (2008), and Bertomeu (2012).

2.4.2. Socioeconomically optimum allocation of forestry resource use

Within this framework, the use of the theory of socioeconomic allocation of resources refers specifically to analysing the conditions required for economic efficiency that will lead to a decision on the alternatives that provide the best socioeconomic benefits to the whole of society (Pearse, 1990; Klemperer, 1996; Dore and Mount, 1999; Willinger, 1999). Since most forest resources have historically been within the public domain, this welfare-based approach provides the theoretical foundations for analysing most state activity in the economic domain of forestry resources, such as the policy on forest -resources management (Dore, 1999).

In this section, the discussion focuses on understanding the conditions required for the optimum allocation of resource use; these conditions are cross-analysed with the characteristics of forestry resources that underlie the management of small-scale commercial tree-growing. Cost-benefit analysis, transaction cost and opportunity cost are the most important concepts within welfare economics that will be used in this study (Williamson, 1979; Lintott, 1998; Urama, 2004; Gowdy, 2005). Decision-making to ensure the optimum socioeconomic allocation is often based on the concept of opportunity costs (Mishan, 1976; Perkins, 1994), which refers to the value of outputs sacrificed by not being directed to their best alternative value (Pearse, 1990; Perkins, 1994). In this case, Cost Benefit Analysis (CBA) is a useful and practical method to assist in public decision-making by evaluating the welfare implications of changes in the pattern of resource allocation and calculating the opportunity costs of a particular chosen economic alternative (Mishan, 1976; Perkins, 1994; Dore, 1999; Willinger, 1999).

Other important conditions for the socioeconomically optimum allocation of resource use are that: property rights over resources are enforced; all transactions have perfect information; there is an equitable distribution of income; no externalities exist; and transaction costs are zero (Pearse, 1990; Klemperer, 1996; Perman *et al.*, 1996).

1. Perfectly competitive markets

In the absence of a market, natural resources cannot be allocated as efficiently as in other cases of environmental resources, such as water (Perman *et al.*, 1996). Theoretically, the most ideal market condition is a perfect market structure, which ensures the socioeconomically optimum allocation of resource use (Pearse, 1990; Klemperer, 1996). Perfectly competitive markets of goods and services provide incentives for the producers to produce at the socioeconomically most advantageous level (Pearse, 1990; Klemperer, 1996; Perman *et al.*, 1996). Among the conditions for perfectly competitive markets are: the free entry of firms and consumers; that firms and consumers are maximising their profits; that the output price is defined purely by market mechanisms resulting from supply and demand for a certain product or services being traded in the market; the free mobility of labour and capital; and that inputs are priced at market value (Pearse, 1990; Klemperer, 1996) (see Section 2.4.3.1 for further discussion on market failures).

2. Property rights over resources are enforced

Property rights should be enforced to prevent open access to resources, in which case welfare would not be maximised due to practices that lead to over-exploitation and conflicts between different stakeholder groups (Pearse, 1990; Klemperer, 1996). There are four common types of property rights regime in the context of natural resource management: open access, common property, state property and private property (Berkes *et al.*, 1989).

3. All transactions have perfect information

Fully informed producers and consumers are able to review all alternatives and choose an option with the highest expected benefits (Williamson, 1979). Under imperfect information conditions, the market cannot function cost-effectively since consumers and producers do not have enough information about the existing resources, products and prices (Kula, 1988; Perkins, 1994; Klemperer, 1996). Limited institutional and physical infrastructures in forest areas contribute to the difficulties of ensuring perfect information-sharing among all parties involved.

4. Equitable distribution of income

Under ideal conditions, the distribution of income among stakeholders, in both current and future generations, must be equitably met (Pearse, 1990; Klemperer, 1996; Perman *et al.*, 1996). This is because the distribution of income governs the pattern of demand for goods and services, and eventually the efficient allocation of productive natural resources, by responding to the market incentives (Pearse, 1990).

5. No externalities exist/no unpriced negative side-effects

Externalities refer to any side-effects or impacts from any natural resource management practice; these can be both positive and negative externalities and usually do not have monetary value unpriced (Perman *et al.*, 1996). Unpriced negative externalities are quite common in forestry practice, such as those resulting from logging that can cause damage to the landscape, soil and water quality (Klemperer, 1996; Perman *et al.*, 1996). Unpriced negative impacts, or negative externalities, are considered as one of the market failures because, being unpriced, there is no market incentive for the producers to eliminate or at least minimise them, even though the benefits of minimising them could often exceed the costs (Klemperer, 1996; Perman *et al.*, 1996). An external effect, or externality, is indicated to occur when the production or consumption decisions of one agent affect the utility of another agent in an unintended way, and when no compensation is made by the producer of the external effect to the affected party (Perman *et al.*, 1996).

6. Transaction costs are zero

In imperfectly competitive markets, there is a probability that bargaining markets between stakeholder groups could form to reduce environmental damage or the government impose regulations that conflict with economic incentives, such as over-regulated taxes and fines as tools that were initially aimed to ensure socioeconomic welfare (Klemperer, 1996; Perman *et al.*, 1996; Kang, 1996). The costs of imposing these bargaining tools and actions are called transaction costs (Kang, 1996; Klemperer, 1996). Transaction costs have a significant impact on investment mainly in the long-term, since these costs affect the opportunity costs of investor ability to seek rents (Kang, 1996).

Failures to ensure all of these conditions occur lead to market failure conditions (Pearse, 1990; Klemperer, 1996). However, the special characteristics of natural resources contribute to the market failure conditions, such as the non-monetary values of ecological services provided (Perman *et al.*, 1996). In practical terms, no market mechanism exists which will ensure that resources are allocated in an optimal way

(Perman *et al.*, 1996). Nevertheless, the framework provides a theoretical basis/benchmark for analysing the practical conditions affecting small-scale commercial tree-growing, mainly the challenges preventing its feasible management. Two components that are considered to be most important in affecting small-scale commercial tree-growing are discussed further in the following sections: market failures in meeting the conditions of perfectly competitive markets (Section 2.4.3.1) and favourable tenurial and right conditions (Section 2.4.4.1).

2.4.3. Market access for small-scale commercial tree-growing

Well-functioning markets offer producers strong incentives to conserve natural resources (Meijerink, 1997; Makhija, 2003; European Environment Agency, 2005). As discussed here, there are several reasons why perfectly competitive markets are not present in most timber production transactions generally, including those produced by small-scale tree growers under market failure conditions (Harrison, 2005). For a theoretical overview of a perfectly competitive market; see for example, Pearse (1990) and Klemperer (1996).

2.4.3.1. Market failures: imperfectly competitive timber market due to unfavourable conditions for forestry investment

Timber management is a long-term investment in nature with high risks due to price fluctuations, tenure insecurity and natural hazards (e.g. fire) (Angelsen and Wunder, 2003; Sunderlin *et al.*, 2004; Herbohn, 2006). Due to the long rotation period, the timber market is characterised by an imperfect market that influences the feasibility of small-scale tree-growing management (Kula, 1988). Commonly in forestry-related investment land is usually the fixed factor, and so labour and capital are the working capital options to maximise the aggregate net returns to the fixed factor (Sedjo, 1983; Pearse, 1990; Klemperer, 1996). However, the capability of land to generate economic returns also depends on many different factors, such as fertility that defines productivity, distance from and accessibility to the market, topography, and other factors that have differing importance for different uses and users (Pearse, 1990).

Since land is used to produce timber, defining the right value of the timber in a forest stand (stumpage value) is a crucial first step to maximise economic returns, since it reflects the maximum price that competitive buyers would be willing to pay in a perfect competitive market (Sedjo, 1983; Pearse, 1990). In other words, low stumpage prices often fail to provide planting incentives to tree growers; therefore, providing incentives through the log market is an obvious alternative (Harrison, 2005)

Unfortunately, due to the long-term rotation in timber production, producers and consumers are not able to respond quickly to price changes, so investment in forestry cannot compete in terms of opportunity costs with other land-based opportunities, such as agriculture, which can generate returns in a shorter term (Pearse, 1990; Klemperer, 1996; Perman *et al.*, 1996). There are six types of production possibilities for two products on an area of land (Pearse, 1990). Firstly is competing uses, such as between timber production and recreational purposes. Secondly is production based on mutually exclusive uses, for example, these uses are between timber production and preservation of a virgin forest. Thirdly is production with highly conflicting uses, such as in the case of timber production and the preservation of amenity values. Fourthly is production with constantly substitutable uses, for example this results from certain timbers (e.g. a timber species that has low market value). Fifthly is production with independent uses, such as between timber production and watershed protection. The last is production with complementary uses, such as between timber production and timber waste management. The opportunity costs of timber production also need to be considered, in terms of the general time preference of people who put more weight on present values than on future values; therefore investment in forestry has to compete with savings behaviour (Klemperer, 1996; Perman *et al.*, 1996). Both need incentives (i.e. favourable interest rate) to compensate for postponing consumption (Klemperer, 1996; Perman *et al.*, 1996); therefore, the discount rate concept becomes important in any analysis looking at the best alternative option for investment (Sedjo, 1983; Perkins, 1994) (see Section 3.3.3 of Chapter 3 for further discussion).

Within an imperfect market structure there exist monopoly, monopsony, oligopoly, oligopsony types of markets, which are mainly defined by the numbers of buyers and sellers (Sedjo, 1983; Perkins, 1994; Klemperer, 1996; Perman *et al.*, 1996). In a monopoly market structure, a monopolist is a single firm in a market producing all outputs of one product or service (Klemperer, 1996). Since a monopolist has market power, the product price will change as its output changes, which would be unlikely to happen to firms that are in a perfectly competitive market as a price taker (Perkins, 1994; Klemperer, 1996). Further, a monopolist's quantity of output tends to be lower with a price that is higher than an equilibrium price level of a competitive market, and profits are likely to be higher than a condition at perfectly competitive market (Pearse, 1990; Klemperer, 1996).

In an oligopoly market, which is the more common case in many product markets, a few producers supply all the output of one product or services in a market (Klemperer, 1996). In oligopoly, the number of buyers/consumers can be few or unlimited (Pearse, 1990; Klemperer, 1996). Under the condition of all else being equal, oligopoly prices and profits would be lower than under a monopoly, but not as low as under perfect competition (Pearse, 1990; Perkins, 1994; Klemperer, 1996). An oligopsony market is also the mirror image of oligopoly, in which there is a limited number of resource buyers (Klemperer, 1996). In relation to timber goods, in an oligopsony market situation, stumpage prices are below the price in the competitive market and consequently there is not enough incentive for timber production (Perkins, 1994; Klemperer, 1996).

Considering different types of market structure, producers of small-scale commercial tree-growing face different possible market conditions, which means it is less likely that the timber market be perfectly competitive (market failure situation). Nevertheless, this is not the only market failure situation that small-scale tree growers have to deal with, since market failures can also result from institutional challenges, such as lack of enforcement of property rights as discussed in Section 2.4.4.1.

2.4.3.2. Potential market characteristics for timber produced by small-scale commercial tree-growing

In a timber market, tree growers are defined as producers, and consumers of their timber are wood-based processing firms of various scales, such as pulp and paper companies. Hampered by the unfavourable characteristics of forestry investment, the economic situation of perfect competition has less significance to small-scale commercial tree-growing management due to several characteristics of timber production itself (Sedjo, 1983; Pearse, 1990; Harrison, 2005). For example, unlike large-scale tree plantation management with almost homogeneous timber production, small-scale tree-growing producers supply the market with non-homogeneous timber (Harrison *et al.*, 2005). Thus the assumption of profit maximisation under a competitive market situation cannot be applied, since small-scale tree-growers mostly aim to have multiple socioeconomic and ecological objectives (Sedjo, 1983; Pearse, 1990; Harrison, 2005). Timber from small-scale commercial tree-growing is produced under various management regimes and a variety of silvicultural practices can be applied (Scherr, 1995; Scherr, 1997; Nawir *et al.*, 2007c; Roshetko *et al.*, 2007; Snelder and Lasco, 2008).

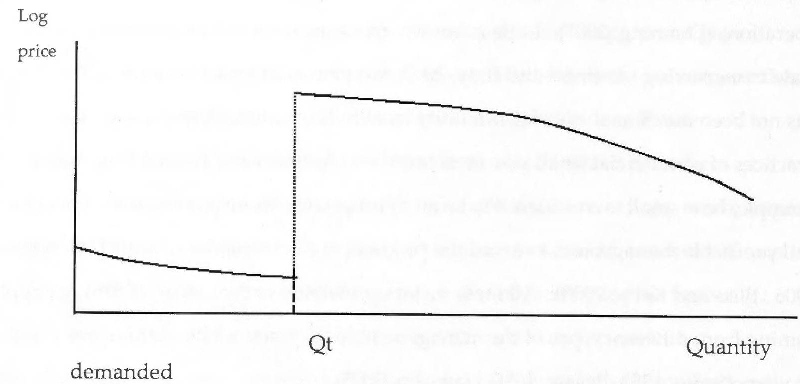
Therefore, in analysing the market structure for small-scale commercial tree-growing, it is important to take into account both favourable and unfavourable timber characteristics (Byron and Arnold, 1999; Arnold, 2001a; Angelsen and Wunder, 2003; Charnley and Poe, 2007). Timber is considered the most important commercial product from these enterprises, and the benefits are mostly captured by outsiders due to the high economic timber rents (FAO, 2001; Ross, 2001; Angelsen and Wunder, 2003; Sunderlin *et al.*, 2004). Similarly, benefits from timber produced in plantations are also captured by private companies and states, rather than forest communities (Nawir *et al.*, 2003b; Dunning, 2007). For example, based on a meta-analysis of 54 case studies of research into household livelihood strategies in East and South Africa, Asia and Latin America, it has been suggested that the contribution of timber to community household incomes is only 2%, compared to incomes from wild food, fuel-wood, fodder, grass, and wild medicine at 84.5% (Vedeld *et al.*, 2004).

Furthermore, management of small-scale tree-growing enterprises is characterised by several unfavourable factors (Table 2-4). For example, a feasible economy of scale requires a specific minimum production level, which can only be met by large-scale operations (Dunning, 2007). Little is known about the commercial aspects of small-scale tree-growing (Antinori and Bray, 2005; Montambault and Alavapati, 2005). There has not been much analysis of community smallholder entities that focus on the practices of commercial small private enterprises (Antinori and Bray, 2005). For example, how small is considered to be an appropriate commercial scale for effective and profitable management to avoid the problem of diseconomies of scale (Herbohn, 2006 ; Bliss and Kelly, 2008). All these factors contribute to the nature of timber supply coming from different types of the management level practiced by various tree growers (Sedjo, 1983; Pearse, 1990; Harrison, 2005).

Table 2-4. Characteristics of timber not favouring investment on small-scale tree-growing for commercially competitive management
1. Long-term investment with high risks with no significant intermediate returns
2. High requirement for capital, technology and skills that are often beyond the capacities of rural communities
3. Economy of scale is an important determining factor for a business to become economically feasible and competitive beyond a specific minimum production level
4. Specialised products increasingly required by the markets often need unique skills
5. Trees are immobile assets that need secure land tenure or usufruct rights for accessing the mature trees at the end of the full rotation
6. Most trees are pure 'cash crops' and cannot be used for subsistence even when food crops fail

Sources: Byron and Arnold (1999); Arnold (2001); Angelsen and Wunder (2003); Herbohn (2006); Nawir *et al.* (2007b); Snelder (2007).

As discussed in Section 2.4.3.1, due to the long rotation period, some limitations of timber production prevent small-scale operations from being able to respond immediately to price signals in supplying the market (Pearse, 1990; Klemperer, 1996). Similar to the nature of supply curves, there is also a time-lag in the demand curves for timber produced by small-scale tree-growing (Figure 2-2) (Harrison, 2005). The time-lag is mainly the gap in timber quantity that is demanded before the expansion of wood processing is possible, and the additional timber quantity that is demanded after the expansion can be established (Harrison, 2005). However, the decision to expand is determined by various factors, such as when the price signals in the market for particular products keep increasing.



Source: Harrison (2005).

Figure 2-2. Long-run log demand curve, with discontinuity at threshold volume for wood processing to establish

Recognising that the demand for timber in a market is a derived demand, including timber produced by small-scale tree-growing that is in demand as input to produce various types of final products (Sedjo, 1983; Pearse, 1990; Klemperer, 1996; Harrison, 2005), it is therefore important to understand the characteristics of potential market niches for timber coming from small-scale commercial tree-growing (Scherr, 1995; Bliss and Kelly, 2008). These include: (1) The growing wood market in developing countries, particularly high-volume markets for low-grade construction timber; (2) The certified-product market for ecologically and socially responsible management; (3) The market from wood-based processing companies (e.g. pulp and paper) facing limited opportunities for the expansion of their plantations, mainly in developing countries; and (4) New opportunities from globalising markets that create opportunities for non-traditional suppliers–buyers (beyond country boundaries) who are more proactive in seeking and securing reliable sources of scarce commodities. These types of markets provide useful references in the analysis.

2.4.4. Institutional and policy conditions that influence the feasibility of small-scale commercial tree-growing

This section outlines the framework of property rights and other relevant institutional conditions, focussing on a framework for small-scale tree-growing to be more responsive to market opportunities.

2.4.4.1. Tenurial and property rights conditions under the state-nested system

Property rights characterise the wood production strategy of small-scale tree plantations, as well as influencing their long-term feasibility and viability, for example in relation to the benefit stream from tree-growing (Dewees and Saxena, 1997b; Simmons *et al.*, 2002; Dunning, 2007; Roshetko *et al.*, 2008). Further, the enforcement of property rights is one of the conditions that must also be met in ensuring optimum socioeconomic resource allocation (Pearse, 1990; Klemperer, 1996; Perman *et al.*, 1996), particularly because property rights enforcement governs the efficiency of resource use throughout an economy, as well as the distribution of benefits (Klemperer, 1996).

As also discussed in Section 2.4.2, the property rights and tenure regime is part of an important concept in economics, since it rules the efficiency of resource use as well as the distribution of benefits generated throughout an economy (Pearse, 1990; Perman *et al.*, 1996). The interlinkages between property rights and tenure regime of the resources and the clear incentives that might result are also crucial in ensuring that the local community is able to capture the benefits from any forest product extraction, particularly timber (Coase, 1960; Place *et al.*, 2004; Meinzen-Dick and Gregorio, 2004; Meinzen-Dick *et al.*, 2006). This happens since the existing property rights and tenure regime stimulates individual and collective actions in responding to economic and market opportunities for sustainable livelihoods (Arnold, 1998; Ostrom, 2000; FAO, 2002; Meinzen-Dick and Gregorio, 2004; Meinzen-Dick *et al.*, 2006).

A property right is defined as an enforceable power to undertake particular actions in particular domains (Ostrom, 2000). However, a property right is not absolute, as the use of assets may be subject to legal controls (Black, 2002). In reality, rights do not necessarily imply full ownership and the exclusive authority to use and dispose of a resource; different individuals, families, groups, or even the state often hold overlapping use and decision-making rights over the same piece of property (Meinzen-Dick *et al.*, 2006).

Within the context of this thesis, the theoretical framework focuses on having a better understanding of four common property right types, delineating dimensions of the property rights system, and drawing the economic implications of resource use efficiency and the distribution of benefits based on the application of the property rights system in forest management (Ciriacy-Wantrup and Bishop, 1975; Pearse, 1990; Holloway *et al.*, 2000; Ostrom, 2000; Meinzen-Dick *et al.*, 2004).

2.4.4.1.1. The classic property rights system and its development

The four common types of a classic property rights regime within the context of forest resources management are: open access, common property, state property and private property (Berkes *et al.*, 1989).

The first type, open access, is the term used to describe the condition in which there is an absence of any well-defined property rights and, as a consequence, the resources are open to everyone and no one has the legal right to exclude anyone from using the resource (Ciriacy-Wantrup and Bishop, 1975; Berkes *et al.*, 1989; FAO, 2002). The second type, common property, describes the rights to a resource held by a group of identifiable users who apply certain access rules to its members and exclusion rules to non-members (Burger and Gochfeld, 1998; Ostrom, 2000). Another term for this situation, used by Berkes *et al.* (1989), is 'communal property'. The term common property has often been confused with the term 'common-pool resources' and has generated some misinterpretation (Ostrom, 2000). Common-pool resources refers to resources that are available for use by all, whether in an unregulated ('open access') or a regulated way, and they may be owned by national, regional or local governments, by communal groups, by private individuals or by corporations (Arnold, 1998; Ostrom, 2000; Meinzen-Dick *et al.*, 2006). This can include de facto property rights, which may or may not be supported by legal authorities, and more secure rights under a 'de jure' right (Ostrom, 2000). The general principle applied here means that the use of the resource by one user decreases the supply available to others.

The third type, state property, reflects a condition where the state holds the prominent right to regulate the resource, including the right to exploit it or to allocate access to the public, to subsidise its use by certain people, and to enforce sanctions for any rights violation (Berkes *et al.*, 1989; Burger and Gochfeld, 1998). However, an effective and strong state enforcement is required to prevent accelerated degradation of the resource (Berkes *et al.*, 1989). Otherwise, a de facto open access condition can result from the process of nationalisation of traditional common property into de jure state property (Berkes *et al.*, 1989). This is quite a common trend due to the fact that most natural resources, such as forests, are government-owned property (state forest). The state forest is a dominant property regime in countries with a high proportion of forest. From 3.9 billion hectares of the estimated global forest estate, 77% is owned and administered by governments (White and Martin, 2002). The remaining areas are reserved for communities (4%), owned by local communities (7%) or owned by individuals (12%). The fourth type, private property rights, refers to individual or corporation-owned property with full exclusive rights to manage, sell or rent, as well as to exclude others from having any access to the property (Berkes *et al.*, 1989; Burger and Gochfeld, 1998).

2.4.4.1.2. *Dimensions of property rights and their economic implications for the efficiency of resource use and the distribution of benefits*

Following Pearse (1990) and Ostrom (2000), the dimensions of property rights are defined to include: (i) comprehensiveness; (ii) duration; (iii) benefits conferred; (iv) transferability; and (v) exclusiveness of forest tenure. The application of this concept in this thesis is presented in Chapter 6 (Section 6.2.3.1).

(i) Comprehensiveness represents the coverage of rights up to the full range of benefits. Under full comprehensive rights, the expected behaviour by the property holder leads to optimal allocation with the most beneficial economic benefits.
(ii) Duration pertains to the extent of time catered for by a certain property rights status. The duration aspect influences several important decisions with certain

possible economic implications, such as the extent to which the holder will take into account the future impacts of his actions. It also includes investment by carefully considering future relative economic advantages and disadvantages within a certain period of time, such as the decision to harvest now or in the future. Duration influences long-term decision-making, particularly in timber production, by taking into account the long-term characteristics of forestry investment, such as choosing the discount rate in estimating future benefits. Duration is therefore a primary determinant of the holders' security and of the continuity of timber supply. This provides the incentives to invest for the long-term and to make a management decision allowing for more efficient resource uses (Pearse, 1990; Dunning, 2007; Roshetko *et al.*, 2008).

(iii) Benefits retrieved refer to the extent to which the property rights provide their holders with the right to enjoy the potential economic benefits from the property, such as a forest. A range of estimated benefits from the property serves as an incentive to manage resources more efficiently and eventually affects the value of the property and the distribution of income from the same property. However, these potential benefits are often constrained by government restrictions on how a forest can be harvested, managed or utilised, resulting in high transaction costs (Pearse, 1990; Ostrom, 1999; Macqueen, 2001; Meinzen-Dick *et al.*, 2004). Transaction costs refer to those costs that arise when individuals exchange ownership rights for economic assets and enforce their exclusive rights (Pearse, 1990).

(iv) Transferability reflects the capability to transfer or assign the property from one holder to another. Transferability is an important criterion, since the economic efficiency of certain types of management of resources depends upon the acquisition of resources by those who can generate the most value from them, moving away from less efficient alternatives to more economically productive uses. The transferability level of property ranges from absolutely non-transferable, to limited transferability, to flexible transferability. Absolutely non-transferable property has no market value and impedes the efficient allocation of resources. Government policy restrictions often prevent the transferability option.

(v) Exclusiveness reflects the characteristic by which the property holders can claim the rights absolutely, to the exclusion of others. The privilege to be exclusive of 'third parties' is an essential holders' incentive to conserve and to invest for the future with the expectation of capturing the full benefits of their individual decisions and actions. When property ownership rights are not exclusive and their holders compete with others for the same benefits, such as timber, there is a strong possibility that the property will become open access and most likely be exploited inefficiently in a short time.

Despite the increasing trends towards community-controlled forest tenure, insecure forest access and ownership rights for most tree growers is still a major constraint in many tropical, forest-rich countries for local forest business development and expansion (White and Martin, 2002; Scherr *et al.*, 2003).

2.4.4.1.3. Small-scale tree-growing practices based on control or ownership rights over tree and land resources

There are three ways in which communities have control over or possess the ownership of forest lands to practise tree-growing: on their own private land, on communal land, and on state land that is usually allocated to a community as an individual or as a group (FAO, 1985). Management of trees and land resources for these three categories can be based on a collective arrangement, as in communal tree-growing, or on individually managed resources as part of farm forestry practices (Table 2-5).

Table 2-5. Management of tree and land resources based on control or ownership of forest resources and land

Management of trees and land resources	Types of control or ownership of resources		
	Private	Communal	State
	Communal tree-growing		
Communal	Tree-growing on private land organised by community institutions	Communal tree-growing on community lands	Public land allocated for communal and community-based forestry projects
	Farm forestry		
Private	Privately managed tree farming and tree planting around households	Privately-managed tree-growing on communal or community lands	Public land allocation scheme for private tree-growing
	Tree-growing under co-management		
Co-management	Co-management implemented on privately-owned lands (e.g. outgrower scheme)	Co-management implemented on communal lands (e.g. Joint Forest Management)	Co-management implemented on state lands allocated for tree-growing (e.g. CBFM in the Philippines)

Sources: Adapted from FAO (1985); Mayers (2000); Arnold (2001b); Calderon and Nawir (2004).

In the 1990s, following the general trend in community forestry development, co-management also became an option in community tree-growing, for example through contractual arrangements under the out-grower scheme between communities and private companies of Sappi and Mondi in South Africa, and under the partnership agreement between community groups and the state in the Joint Forest Management scheme in India and in the CBFM (Community Based Forest Management) Program in the Philippines (Mayers, 2000; Arnold, 2001b; Mayers and Vermeulen, 2002; Nawir *et al.*, 2003a; Calderon and Nawir, 2004).

Under such co-management or partnership arrangements, tree plantings have become increasingly more monoculture-oriented, aiming to optimise the land's productivity in a way that is often driven more by community partners' objectives, i.e. to meet reforestation objectives under co-management with state agencies, and to meet the commercial objectives of companies' wood-processing plants under the out-grower scheme (Cairns, 2000; Calderon and Nawir, 2004; Nawir and Santoso, 2005; Carle, 2007; Midgley *et al.*, 2007a; Midgley *et al.*, 2007b; Nawir *et al.*, 2007b; Herbohn *et al.*, 2014).

Due to the strong incentives from emerging new market opportunities, small-scale tree-planting management has increasingly become more market-oriented (Arnold, 1997b; Dewees and Saxena, 1997b; Anyonge and Roshetko, 2003; Scherr, 2004; Bliss and Kelly, 2008; Macqueen, 2013). Tree-growing developed on secure, privately owned land has more flexibility in responding to this growing market demand, although it may also be responding to environmental imperatives (Scherr, 2004; Nawir *et al.*, 2007g; Snelder and Lasco, 2008; Noordwijk *et al.*, 2008). The security of land ownership has been the main motivating factor in developing private tree-growing plantations, since households feel confident that they can harvest what they have planted (Pasicolan *et al.*, 1997; Suharjito, 2005; Darusman and Hardjanto, 2006; Kartodihardjo, 2010). Moreover, tree growers act as the managers of their own land, so they can make all the investment decisions in relation to both timber and non-timber crops in responding to market signals (Geilfus, 1997/98; Ume-Laila and Anjum, 2001; Schuren and Snelder, 2008; Sabastian *et al.*, 2014).

Wood coming from private tree-growing often has comparative advantages in supplying small to medium industries, in comparison to wood coming from large-scale plantations (Emtage, 2004; Kurniawan *et al.*, 2008; Auer, 2012; Perdana *et al.*, 2012; Putzel *et al.*, 2012; Robiglio *et al.*, 2013). This is particularly because small to medium industries may prefer to buy logs sourced from communities because of the difficulty in bargaining with large-scale plantations (Triple Line Consulting, 2005; Kurniawan *et al.*, 2008). Households practising private tree-growing have to deal in an open market situation, with the wood price being set based on negotiation and no standardised price applying;, administration procedures may be less complicated; and the distance from the source of the trees and their markets is usually shorter (Emtage, 2004; Triple Line Consulting, 2005; Nawir and Manalu, 2006; Kurniawan *et al.*, 2008; Perdana *et al.*, 2012; Auer, 2012; Putzel *et al.*, 2012; Robiglio *et al.*, 2013). Moreover, companies processing larger wood volumes are not interested in buying from the smaller wood market, which sells timber coming from small-scale timber enterprises supplied by private tree-growing households (Triple Line Consulting, 2005; Kurniawan *et al.*, 2008; Santos Martín *et al.*, 2012; Wiersum *et al.*, 2013). However, wood buyers such as middle-men and brokers often take advantage of these characteristics for their own benefit (Nawir and Manalu, 2006; Kurniawan *et al.*, 2008).

2.4.4.2. Other institutional conditions for socioeconomically feasible management of small-scale tree-growing

Overly regulated mechanisms for timber harvesting, marketing and transportation have been identified as the main challenges in providing optimal support to small-scale tree-growing (Carle, 2007; Midgley *et al.*, 2007a; Midgley *et al.*, 2007b; Nawir *et al.*, 2007b; Tomaselli *et al.*, 2012; Foundjem-Tita *et al.*, 2013). These policy barriers have created high transaction costs that have to be covered by small-scale growers, as well as creating a distorted market and higher timber prices to reflect the real opportunity costs of producing timber (Meijerink, 1997; Enters *et al.*, 2004; Adhikari and Lovett, 2006; Foundjem-Tita *et al.*, 2013). Therefore, removing policy barriers is identified as one of the main solutions to enable small-scale tree-growing to be able to respond to market opportunities, after the need to develop feasible forest enterprise frameworks is met (Table 2-6) (Scherr *et al.*, 2003; Scherr, 2004; Bliss and Kelly, 2008; Nawir, 2013).

Overall, the framework for developing forest enterprises aims to improve the position of small-scale producers, allowing them to become commercially viable in response to market opportunities (Antinori and Bray, 2005; Dunning, 2007; Macqueen, 2013). This can be done through a variety of options, such as searching for opportunities to establish strategic business partnerships that require a long-term perspective for business development, flexible contract terms, special attention to reducing business risks (such as spreading sources of supply among different producer groups), and a mechanism to reduce transaction cost (Scherr *et al.*, 2003; Angelsen and Wunder, 2003; Scherr, 2004; Mayers, 2006; Macqueen, 2013). Further, to be able to capture the increasing market opportunities, growers need to understand their market niche and determine a competitive position towards the low-cost industrial producers, such as by using trees from land clearing and illegal harvesting to provide supplies in a similar market (Anyonge and Roshetko, 2003; Scherr, 2004; Macqueen, 2013).

In supporting commercially viable small-scale enterprises, the attention should also be focussed on establishing and strengthening the roles of grower associations. The lack of strong and professionally managed grower associations with good commercial and business knowledge and skills has contributed to the difficulties encountered by small-scale tree-growing management in taking advantage of the promising market opportunities, for example by depending heavily on market brokers and receiving price differentiations (Scherr, 2004; Macqueen, 2007). Having a strong growers association can also assist growers to become more competitive within the globalisation context (Scherr *et al.*, 2003; Macqueen, 2007; Midgley *et al.*, 2007a; Macqueen, 2013)

Table 2-6. Framework for small-scale tree-growing to be responsive to market opportunities
1. Developing small-scale forest enterprises: • Improve market position by identifying the right market niches • Strengthen producer organisations as well as having good commercial and business knowledge and skills • Promoting strategic business partnerships through effective partnerships with other commercial actors • Establish business services that meet the special requirements of the lower-income producer • Having education and research programmes in looking at the alternatives for forming a commercially viable community-based forestry sector in terms of production, processing and business management.
2. Removing policy barriers: • Secure forest access and ownership rights of local people to ensure those who are involved can gain long-term benefits • Remove regulatory barriers to simplify the requirements of management plans for small-scale producers • 'Level the playing field' in forest markets, so forest market policies do not discriminate against small-scale producers • Involve local producers in policy negotiations for more practical, realistic and lower-cost laws, market regulations and development plans • Protect the 'poorest of the poor' forest users and producers without sacrificing others' potential income gains from the commercialisation of public forests under sustainable management.

Sources: Adapted from Scherr (2004); Scherr *et al.* (2003); Warner (2007); Bliss and Kelly (2008); Noordwijk *et al.* (2008), Roshetko *et al.* (2008).

2.5. Conditions for small-scale tree-growing to be more commercially competitive

Various challenges have constrained small-scale tree-growing from becoming commercially competitive, especially under current policies favouring other plantation development strategies, such as large-scale timber operations (Donovan *et al.*, 2006). Removing policy barriers is an important first step in stimulating small-scale commercial tree-growing; however, this will not be effective without putting in place the right incentives framework (Meijerink, 1997; Scherr *et al.*, 2003). As the research also focuses on finding strategies to improve the relative competitiveness of small-scale commercial tree-growing compared to other wood production strategies, it is important to have within the framework a benchmark that has been developed from the incentives framework for the overall development of forestry plantations (Meijerink, 1997; Enters *et al.*, 2004; Foundjem-Tita *et al.*, 2013).

2.5.1. Incentives for smallholder wood production

The term 'incentives' is simply defined as what stimulates or motivates (Camino Velozo, 1987). Therefore, it must be defined further to meet the specific purpose of a particular study. In the context of stimulating forest plantation establishment and management, the term 'incentives' is defined as:

> *Policy instruments that increase the comparative advantage of forest plantations and thus stimulate investments in plantation establishment and management* (Enters et al., 2004).

Drawing from this definition, for the purposes of the study in this thesis, the term 'incentives' is specifically framed as meaning those policy instruments that increase the comparative advantages of small-scale tree-growing, so that it becomes more competitive compared to other plantation development and management strategies (Enters *et al.*, 2004; Meijerink, 2007). For this reason, such incentives may be described as 'levelling the playing field' between small- and larger-scale plantations.

For the purpose of the research in this thesis, the two incentives frameworks developed by Meijerink (1997) and Enters *et al.* (2004) have been integrated. Meijerink (1997) developed the framework for tree-growing within the context of sustainable forest management, and Enters *et al.* (2004) developed a framework in the context of forest plantation development in general for the Asia and the Pacific region. The combined incentives framework drawn from these sources is explained in Table 2-7. The incentives are divided into direct and indirect incentives, and indirect incentives are categorised into variable and enabling incentives.

There are three important reasons why creating the right incentives is crucial. Firstly, there is a high expectation that under the current trends of implementing decentralisation and devolution of power to local communities in Indonesia, the role of government will have shifted from being involved directly in implementing any programme to taking a prominent role in providing direction, facilitating and stimulating the key agents to become interested in implementing any forestry-related programmes voluntarily (Berkes *et al.*, 1991; Meijerink, 1997; World Bank, 1998; Carlsson and Berkes, 2005). Secondly, a 'command-and-control' approach, in the absence of economic incentives, has been demonstrated to be ineffective in stimulating more sustainable natural resource management and successful execution of reforestation initiatives (Wunder, 2005; Nawir *et al.*, 2007g). Therefore, an incentives framework is required since the opportunity costs of other land uses are higher due to, among others, an unfavourable policy framework, which is quite common in tropical forest-rich countries (Meijerink, 1997;.Carment, 2003; Enters *et al.*, 2004; Nawir and ComForLink, 2007; Nawir *et al.*, 2007b; Irland, 2010). Therefore, as discussed in Section 2.4.4.1, secure forest access and ownership rights of local people are among the most important issues in removing policy barriers.

Table 2-7. Incentives framework for plantation development

Direct incentives [a]	Indirect incentives [b]		
	Variable incentives [c]		Enabling incentives [d]
	Sectoral	Macro-economic	
• Seedlings • Specific provision of local infrastructure to support plantations • Grants • Tax concessions • Differential fees • Subsidized loans • Cost-sharing arrangements	• Input and output prices • Harvesting restriction on timber coming from natural forests • Trade restrictions (e.g. tariffs) • Reasonable timber transportation tariff	• Exchange rates • Interest rate policies • Fiscal and monetary measures (e.g. income taxes)	• Land tenure and resource security • Socioeconomic conditions • Accessibility and availability of basic infrastructure (ports, roads, electricity, etc) • Producer support services • Market development • Credit facilities • Political and macro-economic stability • National security • Research and extension

Notes:

a. Direct incentives are granted directly by various agencies, such as governments, development agencies, non-governmental organisations and the private sector.

b. Indirect incentives include variable incentives and enabling incentives.

c. Variable incentives include economic drivers that have an effect on the net returns that producers earn from plantation activities.

d. Enabling incentives which include those factors influence producers' decisions that are not concerned with directly bringing about changes in the management through financial or similar stimulus.

Sources: Adapted from Meijerink (1997); FAO (1999); Enters *et al.* (2004).

2.5.2. Regulatory framework

Restrictive timber regulations are another constraint to promoting competitive wood production by smallholders and to overcoming supply shortfalls (Maturana *et al.*, 2005; Triple Line Consulting, 2005; Nawir and ComForLink, 2007; Djamhuri, 2008). This is because regulations designed for large-scale timber production (e.g. cutting and transportation permits, registration procedures) are also applied to smallholders (CIFOR and ICRAF, 2006; Nawir and ComForLink, 2007). This has resulted in an uncompetitive business environment and high—often unbearable—transaction costs for smallholders. It can be difficult for government to develop policy instruments, such as economic incentives, to address these impediments, due to poor information about the overall economic characteristics of smallholder tree-growing operations along timber supply chains, e.g. the transaction costs and who bears them. Moreover, the economic returns from other land-use options or other income sources are perceived to be higher than those from tree-growing, and the rate of expansion of small-scale plantations has been lower than the rates of conversion of natural forests for other purposes, such as oil palm or rubber plantations (Potter and Lee, 1998; Sunderlin *et al.*, 2000; Nawir *et al.*, 2003b). This situation can cause low grower interest, especially where there is an absence of local markets and unclear linkages between timber planting and markets.

Government influences market supply, demand and prices through taxes, royalties and other fiscal or regulating policies aimed at correcting the market failure in redistributing income (Pearse, 1990; Perkins, 1994; Klemperer, 1996; Perman *et al.*, 1996). However, often such government interventions lead to an over-regulatory policy framework that becomes ineffective and leads to high transaction costs that become burdens in small-scale commercial tree-growing (Antinori and Bray, 2005; Harrison *et al.*, 2005; Nawir *et al.*, 2007b). Considering that the characteristics of small-scale commercial tree-growing are different from those of other types of forestry management, such as large-scale operations, the potential implications of applying policy instruments to small-scale commercial tree-growing as incentives should be carefully analysed (Sedjo, 1983; Scherr *et al.*, 2003). Otherwise, they may be counter-productive (i.e. act as disincentives).

2.6. Conclusions

Overall, small-scale tree-growing practices are in transition, shifting from subsistence-oriented to more commercially oriented management and aiming for higher economic returns in response to various internal and external pressures, such as the increasing areas of degraded forest, land-scarcity, and market demand. Research in this thesis aims to identify the socioeconomic benefits for those involved in small-scale tree-growing and for those investing in developing small-scale timber production, as well as the positive benefits from securing the country's national wood production strategies.

The conceptual framework in this thesis is therefore centred on two components: first, the conditions for the socioeconomically feasible management of small-scale commercial tree-growing, and second, the conditions for small-scale tree-growing to become commercially competitive with the right incentives framework in place to complement other strategies in meeting the national wood demand. The theories used in supporting the conceptual framework integrate several concepts, since the issues and challenges are complex. This is partly due to forestry investment characteristics that influence the management of small-scale tree-growing in responding to market opportunities, and in comparison to other opportunities. The next chapter presents the research design for the study in the context of this conceptual framework.

Chapter 3. Research design

3.1. Introduction

The main objective of this chapter is to explain the research design used in this thesis. Initially, this chapter discusses the refined research questions that guide the scope of the four stages of the analysis (Section 3.2). The methodology is further designed as explained in the subsequent section (Section 3.3). Following the methodology section, the units of the analysis and data sources are described (Section 3.4). They comprise empirical case study data and other documentary sources. The reasons and justifications for choosing selected case studies are also discussed. The last section discusses the limitations of the research (Section 3.5).

3.2. Scope of the analysis and refining the research questions

As discussed in Section 1.4 of Chapter 1, there are four stages of the analysis: (1) Analysing the socioeconomic performance and relative advantages of small-scale commercial tree-growing strategies; (2) Comparing the socioeconomic performance and relative advantages of small-scale commercial tree-growing strategies with alternatives that use similar resources; (3) Analysing the relative advantages of small-scale commercial tree-growing strategies in seeking policy options for promoting small-scale commercial tree-growing strategies; and (4) Analysing the potential contribution to the national wood production strategies.

3.2.1. Analysing the socioeconomic performance and relative advantages of small-scale commercial tree-growing strategies

There are two main objectives of this analysis: (1) to understand the nature of management required for the two identified small-scale commercial tree-growing strategies under the current socioeconomic and policy framework; (2) to understand their economic performance, and the extent of their contribution to the welfare of society when using scarce forest resources. This analysis particularly addresses research question 1. In specifying the points to be addressed in the analysis, this research question 1 is refined into four sub-research questions (Table 3-1).

Table 3-1. Research question 1 and its sub-research questions to be addressed in the analysis: analysing the socioeconomic performance and relative advantages of small-scale commercial tree-growing strategies
What are the advantages and disadvantages of the two current schemes?
Sub research questions:
1a. How can the management of the two schemes be characterised? 1b. What are the advantages and disadvantages of the two schemes, specifically in terms of the socioeconomic conditions and policy frameworks? 1c. What are the results of the Cost and Benefit and Analysis (CBA) of the two schemes? 1d. What are the main socioeconomic and policy factors affecting the current level of management and how do these affect the results of CBA analysis, e.g. reflect the dominant cost component?

The key variables identified and included in the first analysis comparing the advantages and disadvantages are identified based on field observations and literature review (Raintree, 1991; Dewees and Saxena, 1997b; Meijerink, 1997; Nawir *et al.*, 2003b; Scherr *et al.*, 2003; Dunning, 2007; Hindra, 2007; Midgley *et al.*, 2007b; Roshetko *et al.*, 2008). The comparative analysis method (Section 3.3.1) is used closely in association with the case study approach (Section 3.3.2). See Table 3-5 for key variables included for comparison and analysis.

Within this comparative analysis framework, for the first analysis, aspects for comparison include economic performance derived from the results of the Cost Benefit Analysis (CBA) and the descriptive qualitative analysis. While the CBA focuses on the quantitative analysis, the descriptive qualitative analysis focuses on providing more in-depth explanations of the interpretations of the results from the CBA. The main socioeconomic and policy obstacles affecting the current level of management are also identified and analysed to what find the extent of the impacts on economic performance.

3.2.2. Comparing the socioeconomic performance and relative advantages of small-scale commercial tree-growing strategies with alternatives that use similar resources

The second analysis compares the socioeconomic performances of other alternatives using similar land resources that would have been used for small-scale commercial tree-growing under different strategies. This analysis addresses research question 2, which is further refined into four sub-research questions (Table 3-2).

Table 3-2. Research question 2 and its sub-research questions to be addressed in the analysis: comparing with alternatives that use similar resources

What are the benefits and costs, in both social and economic terms, of the two existing schemes in comparison to other investment options using the same lands?
Sub research questions:
2a. What are the advantages and disadvantages of the two schemes in comparison to other investment options, specifically under what socioeconomic conditions and policy frameworks do these cases take place? 2b. What are the results from CBA of other investment options with the highest opportunity costs for each small-scale tree-growing strategy? 2c. How do these results compare with those CBA of the two existing strategies for small-scale tree-growing (2a)? 2d. What are the main underlying factors affecting the economic returns for each of these strategies in comparison to their investment alternatives?

Specifically, this analysis focuses on comparing the economic returns of the two existing strategies to other investment options for land use with the potentially highest generated economic benefits. Therefore, the CBA is conducted for these alternative land use options, particularly those with the highest opportunity costs (Pearse, 1990; Perkins, 1994). The alternative land uses, as further discussed in Section 3.4, were identified from direct field observation and supported by reports written by other researchers (e.g. P3SE, 2001; Puspitasari, 2003).

In this CBA, socioeconomic and policy obstacles are also identified, for example as those reflected from dominant cost components, and by analysing economic returns to labour and land. The identification focuses on the specific regulatory framework that applies or does not apply to land use alternatives that have affected small-scale commercial tree-growing strategies in terms of becoming less commercially competitive when competing with the other land use alternatives. Qualitative analysis is also conducted to provide more in-depth explanations in interpreting the results from financial analysis.

3.2.3. Analysing policy options for promoting small-scale commercial tree-growing strategies

The objective of the third stage is to understand different incentive scenarios through adopting alternative policy and economic interventions. This analysis addresses research question 3. Three sub-research questions are further defined in the points that are addressed in the analysis (Table 3-3). In addressing research question 3, the main method used is also scenario analysis.

Table 3-3. Research question 3 and its sub-research questions to be addressed in the analysis: analysing impact scenarios of policy interventions
How does this analysis suggest policies and schemes to promote small-scale commercial tree-growing in Indonesia should be designed?
Sub research questions:
3a. Considering the main socioeconomic and policy impediments identified earlier (from the analysis in response to research questions 1 and 2), what policy and economic incentives can be proposed to improve the competitiveness of small-scale tree-growing strategies? 3b. What hypothetical improvement scenarios can be developed? 3c. What impact scenarios of the proposed recommendations for improved strategies can be developed and analysed, particularly in terms of the potential benefits and risks?

3.2.4. Analysing the relative advantages of small-scale commercial tree-growing strategies as part of the national wood production goals

The objective of the last analysis is to analyse the potential role for timber production from small-scale commercialised tree-growing to fill the gap in national wood supply. Specifically, this analysis addresses research question 4. Four sub-research questions are further defined in specifying the points to be addressed in the analysis (Table 3-4). Wood processing industries using timber production coming from the two strategies of small-scale tree-growing are identified and their wood requirements analysed. The methodology used in this analysis is scenario analysis (Section 3.3).

Table 3-4. Research question 4 and its sub-research questions to be addressed in the analysis: analysing tree-growing as part of the national wood production goals
How does this information and analysis inform the potential contribution of timber from small-scale commercial tree-growing in the wood production strategies in Indonesia?
Sub research questions:
4a. What is the estimated potential timber production at the national level from the two existing strategies? 4b. What is the estimated potential timber that can be produced under the two strategies, considering the existing capacity of the wood processing industries? 4c. To what extent can the timber production from small-scale tree-growing (question 4a) fill the gap in national wood supply and improve the livelihoods of the local growers?

3.3. Methodology

This section presents discussions on the methodology used in this thesis. Comparative analysis based on a case study approach is the main methodology used. Here, the comparative analysis includes both quantitative and qualitative analysis. Quantitative analysis is carried out primarily by conducting Cost Benefit Analysis (CBA) based on empirical data, so that the potential revenues, and the cost and benefit structures of the two existing schemes, can be better understood. Then, a scenario analysis is conducted using the results of the financial analysis, to assess the impacts of policy options and to propose incentives.

3.3.1. Comparative analysis: quantitative and qualitative analysis

The comparative analysis focuses on the description and explanation of similarities and differences of circumstances or outcomes among large-scale socioeconomic units, such as regions, nations, societies and cultures (See also Smelser, 2003). Specifically, the comparative analysis used in this thesis is an illustrative comparison, which is the most common method of comparative analysis. This method is based on the unit that is chosen mainly for its illustrative value and not systematically selected for statistical representativeness (Rihoux, 2006). The comparative method is applied in both quantitative and qualitative analyses of small-scale tree-growing strategies; other alternative investments in using similar scarce forestry resources are also compared. The most important research strategy for comparative financial analysis is to compare within similar socioeconomic units before making inter-unit comparisons, which can support the analysis in ensuring the associations actually exist for generalisation (Winter and Prohaska, 1983). Further, the comparative analysis should be conducted based on the integrative conceptual/theoretical framework (Winter and Prohaska, 1983). Key aspects and variables used in the comparisons and in the analysis are presented in Table 3-5.

Table 3-5. Key aspects and variables used in the comparisons and in the analysis [a]

Key aspects in the analysis [a]	Variables
(1) Motivating factors and tree-growing objectives	Factors influencing smallholders' decisions to grow trees, which can be economic, socio-cultural, and ecological reasons
	Factors influencing government and private companies for involving smallholders on tree-growing inside state forests
(2) Endowment characteristics	**a. Land ownership characteristics:** Total land managed per household; total land managed inside state forests (areas, proportion to total household managed areas); land ownership outside state forests (areas, proportion to total household managed areas); and land allocation for timber and inter-cropping/other crops
	b. Tenurial and property rights arrangement: The dynamics of tenurial conditions; and dimensions of property rights (comprehensiveness, duration, benefits conferred, transferability, and exclusiveness)
	c. Social capital and its relation to other capitals
(3) Institutional and policy conditions	**a. Institutional and management arrangements:** Processes in initiating the schemes implemented; rules applied; management foci and arrangements (main focus, land allocation, facilitator and mediator, term of contract, working plans, incentives, tree-grower representatives, conflict resolution mechanism, sanctions for forest encroachment, and benefit-sharing agreement)
	b. Overarching policy framework and timber regulation policies: Processes for community in obtaining rights; procedure in verifying the legal status of communities' lands; procedure for proposing the areas to be allocated as APL; procedure for preparing and clearing the land; and procedures for harvesting and transporting timber
(4) Financial analysis: net revenues, benefit and cost structures [c]	Timber potential (standing stocks); timber and non-timber production (inter-cropping or other crops); financial net benefit from timber and inter-cropping; cost components/proportion of different cost components; cost per ha; costs borne by each stakeholder; annual net benefits to all stakeholders (government, cooperative, wood buyers; and private companies); and comparison to other land use alternatives
(5) Potential impacts on livelihoods	Annual net benefit per household at current standing stocks; average return to labour at current standing stock; benefits in comparison to other investment alternatives (with the highest opportunity costs)
(6) Potential market for smallholders timber production and areas for development	Nature of wood demand (market) and the capacity of wood processing industries based on types of product (sawn wood, plywood, veneer, chip wood, and pulp wood)
	Wood production from various sources: *HPH*, land clearing, Perhutani, HTI, private tree-growing, and other sources
	Potential areas for developing smallholders tree-growing: total degraded areas in different regions; and private tree-growing areas.

Notes:

a. Related theoretical framework is discussed in Chapter 2. For no (1) to no (5), results and discussions are presented in Chapter 4 (the community tree-growing scheme), and in Chapter 5 (the community-company partnership scheme); comparisons for the two schemes are in Chapter 6; no. (6) is discussed in Chapter 7 as part of scenario analysis.

b. See Table 3-9 for investment effectiveness criteria; and see also for sensitivity analysis in Table 3-10.

Sources: Adapted from: Raintree (1991); Dewees and Saxena (1997b); Meijerink (1997); Dunning (2007); Hindra (2007); Midgley *et al.* (2007b), Nawir *et al.* (2003b); Roshetko *et al.* (2008); Scherr *et al.* (2003).

3.3.2. Case study approach in comparative analysis

The case study approach focuses on understanding the dynamics of a unit of analysis within single real life contexts. Details are obtained through using multiple sources of evidence (Yin, 1981; Patton, 1987; Eisenhardt, 1989; Yin, 2009). Applying the case study approach in understanding and analysing the socioeconomic context of small-scale commercial tree-growing strategies in Indonesia in this thesis is justified for two main reasons. These are also supported by integrating the key characteristics of case studies (Table 3-6).

Table 3-6. Key characteristics of case studies
1. The phenomenon is examined in a natural setting
2. Data are collected by multiple means
3. One of a few entities (person, group, or organisation) are examined
4. The complexity of the unit is studied intensively
5. Case studies are more suitable for the exploration, classification and hypothesis development stages of the knowledge building process; the investigator should have a receptive attitude towards exploration
6. No experimental controls or manipulation are involved
7. The investigator may not specify the set of independent and dependent variables in advance
8. The results derived depend heavily on the integrative powers of the investigator
9. Changes in site selection and data collection methods could take place as the investigator develops new hypotheses
10. Case research is useful in the study of 'why' and 'how' questions because these deal with operational links to be traced over time rather than with frequency or incidence
11. The focus is on contemporary events.

Source: Benbasat *et al.* (1987).

First, the approach provides appropriate methods in analysing the complex socioeconomic and policy issues of small-scale commercial tree-growing in Indonesia in detail by mixing quantitative and descriptive qualitative analysis. According to Yin (1981) and Flyvbjerg (2004), the case study approach has been particularly useful in understanding complex issues. It aims for exploratory (as a basis for formulating questions or hypotheses), descriptive (an attempt to describe a phenomenon), or explanatory (processes observation) analysis (See also Eisenhardt, 1989; Noor, 2008). As is the case for this thesis, the evidence used in the case study approach is a combination of both qualitative and quantitative information synergistically, in which descriptive qualitative analysis can strengthen quantitative analysis by explaining the rationale underlying relationships exposed in the quantitative data (Jick, 1979; Yin, 1981; Eisenhardt, 1989).

The second reason is that the results from the case study analysis provide the basis for the analysis at national level at a later stage of scenario analysis in responding to research questions 3 and 4. Theoretical generalisation arising from case studies is positioned by demonstrating the existence of causal relationships through logical argumentation (Hillebrand *et al.*, 2001). Methods include multiple data collection; replication in terms of the logic adopted across multiple cases; comparison with the literature, whether conflicting or supporting; and combining qualitative and quantitative data analysis (Eisenhardt, 1989; Johnston *et al.*, 1999). In this thesis, multiple case-based analysis is also carried out since it allows for cross-case analysis and the extension of theory in the search for more general research results (Benbasat *et al.*, 1987). As presented in Section 1.4 of Chapter 1, the criteria used in choosing the case study sites were:

1. One of the two tree-growing practices being researched is implemented widely by local communities. Wide implementation by local communities is important in reflecting practices that have been adopted for long enough, so that lessons learnt from tree-growing practices can be studied.
2. The existence of commercialisation opportunities, such as a wood processing industry, and market opportunities relevant to the area, in which the market could be in another district, province, or island. Having a link with the market is one of the important factors enabling this research to define the strategy to enhance commercial tree-growing as the main focus of the study.
3. A local policy framework in relation to tree-growing practices has at least been initiated by the local government, since this is important as one of the prerequisites in promoting the current practices of small-scale tree-growing to be developed commercially. Under the regional autonomy governance system, the policy framework at the district level is more important than the ones at national level.

3.3.3. Financial Analysis

The technique of cost benefit analysis (CBA) is used to evaluate the welfare implications of changes in the pattern of resource allocation, and serves as a useful guide for public decision-making (Dore, 1999; Willinger, 1999). CBA provides a way to compare alternative courses of action based on their relative costs and benefits, and it uses the opportunity cost concept in defining the actual value of the costs and benefits (Richards *et al.*, 2003). Opportunity cost is defined as the value of the next best alternative forgone by choosing the other alternative (Perkins, 1994; Hernandez *et al.*, 2006). CBA is also used to analyse a project's contribution, whether positive or negative, to the wider group of beneficiaries (Current *et al.*, 1995; Luoga *et al.*, 2000; Kumar, 2002; Venn, 2005; Siregar *et al.*, 2007). In this thesis, financial CBA is used instead of economic CBA, since the thesis is interested in analysing the financial implications for individuals or communities of tree growing or alternative land uses (see further discussion, for example in Perkins, 1994). Further, the thesis recognises that there are several limitations of CBA as an approach in comparing the two tree-growing strategies, and addresses these limitations and critiques in Table 3-7. The critiques come mainly from the traditional application of CBA for project feasibility studies that are often biased in the interests of the project proponents.

Table 3-7. Limitations of and critiques towards of the CBA approach

Several limitations of and critiques towards CBA approach	How does the thesis research anticipate the limitations and critiques?
The evaluation and the processes in defining the input-output values have mostly been top-down processes and very subjective, relying on a range of assumptions, particularly for assigning economic values to non-economic benefits/costs that can vary significantly.	The data used in this thesis were based on empirical study using a range of methods of data collection, such as survey, participatory rural appraisal, focus group discussion with a range of stakeholder groups (e.g. community groups, local forestry government office, private companies, and NGOs) in ensuring the information reflected the conditions on the ground.
CBA is based mainly on the concept of economic efficiency that involves maximising net income or profit from a certain resource, which does not necessarily optimise livelihoods.	CBA is used here as a component of policy analysis applying several assessment criteria, and analyses impacts on the livelihoods of the community involved and potential risks to the stakeholders involved.
Choosing an appropriate discount rate can be difficult (especially for evaluating forestry-related investments).	Several recent studies come out with methodological approaches that are more relevant for application on assessment in forestry.
The use of cost-benefit analysis is as much an art as a science depending as it does on the judgment of the user.	Sufficient sensitivity analyses were conducted to counter some of the uncertainty surrounding any technical and economic parameters that have a limited empirical basis.

Sources: Adapted from: Davis and Richards (1999); Richards *et al.* (2003); Hepburn and Koundouri (2007); and Saez and Requena (2007).

Investment effectiveness criteria used are Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Investment Ratio (NBIR), return to labour, Equal Annual Equivalent (EAE), and Land Expectation of Value (LEV) (Pearse, 1990; Perkins, 1994; University of Florida, 2010) (Table 3-8). A CBA approach is relevant to the present and in the broader context, such as the approach used in benefit-cost meta-analysis of investment to assess individual economic impact studies comprising an organisation's research investment portfolio (e.g. McClintock and Griffith, 2010).

Table 3-8. Investment effectiveness criteria	
Net Present Value (NPV) is the discounted net benefit stream (present value, PV)	$$NPV = \sum_{t=0}^{n} \frac{(B_t - C_t)}{(1+r)^t}$$ (Equation 1)
Internal rate of return (IRR) is the discount rate that, if used to discount an investment's costs and benefits, will make the NPV equal to zero	Internal rate of return is the discount rate, r, at which: $$NPV = \sum_{t=0}^{n} \frac{(B_t - C_t)}{(1+r)^t} = 0$$ (Equation 2)
Net Benefit Investment Ratio (NBIR) is a project ratio of the present value of the project's benefit, net of operating costs, to the present value of its investment costs	$$NBIR = \frac{\sum_{t=0}^{n} \frac{B_t - O_t}{(1+r)^t}}{\sum_{t=0}^{n} \frac{IC_t}{(1+r)^t}}$$ (Equation 3)
Return to labour ratio is the ratio of the sum of the project's discounted benefits to the sum of its discounted labour costs.	$$\text{Return to labour} = \frac{\sum_{t=0}^{n} \frac{B_t}{(1+r)^t}}{\sum_{t=0}^{n} \frac{\text{Labour } C_t}{(1+r)^t}}$$ (Equation 4)
Return to labour value to estimate the labour wage in comparison to other investment alternative	Wage rates of labour estimated at NPV equal to zero (Equation 5)
Equal Annual Equivalent (EAE) is the annual value of NPV for the period for the life of the investment	$$EAE = \frac{NPV\,[\,i\,(1+i)^n\,]}{[\,(1+i)^n - 1\,]}$$ (Equation 6)
Land Expectation of Value (LEV) or Soil Expectation Value (SEV) is the present value of bare forest land assuming the project will be replicated an infinite number of times in the future	$$LEV = \frac{NPV\,(1+i)^n}{[\,(1+i)^n - 1\,]}$$ (Equation 7)
Where, B_t are project benefits in period t C_t are project costs in period t O_t are project operating costs in period t I_t are project investment costs in period t	r is the appropriate financial or economic discount rate n is the number of years for which the project will operate

Sources: Pearse (1990); Perkins (1994); and University of Florida (2010).

Decision rules for these criteria are based on the understanding that small-scale tree-growing is an independent investment project and not a mutually exclusive one. The decision rule for NPV is that investment with positive value provides a profitable management option. IRR represents the maximum interest rate that the project could afford to pay on its funds and still recover all its investment and operating costs (Perkins, 1994). As independent investments, all alternatives with an IRR greater than a certain target rate of return, r, are feasible. For the ratio resulting from NBIR and return to labour, the larger the ratio is than one, indicates the greater the level of feasibility of the investment alternative.

Discount rate is an important concept in CBA, since it reflects how people value the present benefits and costs compared to future consumption (Davis and Richards, 1999). Long-term investments, such as in forestry, are very sensitive to the choice of discount rate, since rotations are often much longer than planning cycles for other investments (Hepburn and Koundouri, 2007). The financial analysis of tree-growing investment, which usually provides no major income flows for several years and relies on the assumptions that input and output prices are not expected to increase at the same rate over the investment's period, can follow a typical capital investment model (Perkins, 1994; Scherr, 1995). To account for inflation, a real discount rate was used in this analysis, as well as constant prices for all inputs and outputs (Perkins, 1994). At the time the analyses in this thesis were conducted in 2009, the average interest rate for commercial loans from banks at the regional level in Indonesia in 2008 was 13.52%, and the expected inflation rate for 2010 was 5% (±1%) (BI, 2009). The actual inflation rate in 2010 was 6.96% (BI, 2011). Using these data and following the formula presented as Equation 8, the real discount rate used in this thesis is 8%. This discount rate is considered to be appropriate as it is within the range used by similar research on the timber plantation sector in Indonesia: Jurgens (2008) used a 6% discount rate, and Schneck (2008) used 14% for an *HTR* scheme in West Kalimantan.

$$\text{Real discount rate } (r) = \frac{(1 + R)}{(1 + f_c)} \qquad \text{(Equation 8)}$$

Where
R is nominal discount rate
f_c the expected inflation rate

However, a high discount rate can be interpreted as a high opportunity cost of investment in tree-growing, which in turn reflects the likelihood that future harvests will not be economically viable (Hepburn and Koundouri, 2007). Following this argument, the UK Treasury and other scholars suggested the use of a declining social discount rate for assessing investment in forestry (HM Treasury, 2003; Groom *et al.*, 2005; Hepburn and Koundouri, 2007). However, the calculation in this thesis has not used the declining social discount rate, since the investment in timber plantations will be analysed under highly competitive land-use conditions; therefore, the analysis should be able to show how competitive small-scale tree-growing is, by using the same discount rate in comparison to other investment alternatives.

Since the data used for the CBA were collected in different years (see Section 3.4), adjustment should be made to the financial data when calculating benefits and costs to account for inflation rates that deflated the money values over the whole periods when calculating benefits and costs. The adjustment was completed for all the financial figures at 2009 values by using the CPI (Consumer Price Index) (USAID, 2009) (see Appendix Table 4-3.28 for CPI used).

In this thesis, the financial analysis is conducted from the perspective of parties involved in the collaboration under both schemes. Under community tree-growing schemes, the parties involved are local community (usually as part of a cooperative) and local government (i.e. Forestry District Agency or FDA). Under community-company partnership scheme, parties involved are local community and company. Therefore, the manager included in the financial analysis should include both parties, where the economic decision should be made jointly, especially when both parties contributed costs in initiating and implementing the schemes. Detailed revenues and costs are presented in Table 3-9.

Table 3-9. Revenues and costs in analysing the feasibility from the scheme' point of view [a]

A. Revenues		
Category	Sources of revenues under the two schemes	
	Community tree-growing	Community-company partnership
(1) Timber	Thinning and harvesting at the end of rotation [b]	Harvesting of fast growing species (*Acacia mangium*) [c]
(2) Other crops [d]	Inter-cropping crops: turmeric, ginger, cashew nuts and candle nuts	In Sanggau: rubber (as part of the partnership scheme)
(3) Other revenues	Salvage values from farming tools [e]	No salvage values, since depreciation value is used
B. Costs		
Category	Types of costs under the two schemes	
	Community tree-growing	Community-company partnership
(1) Investment	Government expenses: set-up costs, planning, seedlings, planting, maintenance, supervisions, facilities and infrastructure, education and training, and research and development [f]	Company investment costs: infrastructure, office buildings and machinery
(2) Operational	For timber: community labour on timber maintenance and harvesting; cooperative membership fees (registration fee, annual fee) For inter-cropping crops: community expenses on seedlings; land preparation and fertilisers; and labour	Company expenses: initiating partnership (advanced incentives package); and plantation development (land preparation, planting, maintenance up to two years) Community's contribution: supervision and fire prevention; times for group meetings and negotiation; rubber plantations management
(3) Harvesting and transporting	Administration: acquiring certificate of validity of forest products; forest resources provision (PSDH) Transportation: from farm gate to the nearest wood processing point	Administration: to obtain the permits for harvesting and transporting timber; harvesting, local transporting and handling the wood at log ponds Transportation: to the mill and/or to the nearest port
(4) Other costs	Government-based land rent and tax.	Overhead and transaction costs in comparison to developing company-owned plantations as business as usual case [g].

Notes:

a. Summarised from Appendix 4-3 for the community tree-growing scheme and from 5-3 for the community-company partnership scheme.
b. For information on total standing stocks by species, see Appendix Table 4-3.2; for tree volumes used in estimating yield at various ages see Appendix Table 4-3.3.
c. See Appendix Table 5-3.1 for information on: rotation, productivity, planting distances, standing stocks and requirements for maintenance); for tree volumes used in estimating yield see table in Appendix Table 4-3.3.
d. For reasons in choosing these crops, please see Section 3.4 in this chapter. For detailed inputs for other crops production see Appendices 4-3 (Section C) and 5-3 (Section 2).
e. See Appendix Table 4-3.24 for economic life of farming tools.
f. Up to now (2014), this is used by the central government (MoF) to claim back the standing stocks as government revenues in compensating their investment and other expenses.
g. See Section 5.5.2, Chapter 5 for detailed discussions.

At the end of the calculation process, a sensitivity analysis has been conducted. The main justification for this is because returns from tree-growing are highly variable due to several risk factors, for example in relation to market conditions and prices, unexpected regulation changes, and the discount rates used (Scherr, 1995). The factors used as the basis for the sensitivity analysis in this thesis are set out in Table 3-10. The sensitivity analysis focuses on factors that influence inputs, or outputs, or both.

The results from the quantitative analysis using CBA are supported by a qualitative descriptive analysis, especially in providing the rationale behind the results. Further, qualitative descriptive analysis focuses on explaining any intangible benefits and costs (Pearce *et al.*, 1989; Pearce, 2001). This analysis is carried out within the framework of comparative analysis, as explained in the earlier section (Section 3.3.1).

Table 3-10. Factors used as the basis for sensitivity analysis [a]

A. Timber	
1. Input factors	**Specific factors in each scheme**
Factors significantly influence the management feasibility, and often reflect actual determining conditions, such as dominant cost components	**Community tree-growing scheme:** • In addition to the base case reflecting the existing practices, analysis is also conducted for three other scenarios: including land rent and land tax; transportation costs; and both of these categories • Improved management condition based on higher standing stock level following the appropriate silviculture practices (before illegally logged and encroached) (see Appendix Table 4-3.2 for more detailed discussion) • Feasibility based on government standard costs for developing community-based plantations under *HTR* Programme (see Section 4.4.1, Chapter 4)
	Community-company partnership scheme: • Improved management at company standard productivity refers to 150 m3/ha. Current productivity is based on harvested volume by respondents in the survey, i.e. by FI it is 106 m3/ha and by WKS it is 107 m3/ha. • Transportation costs based on distances: 50 – 100 km and more than 100 km; the 100 km cut-off was based on analysis conducted by Nawir and ComForLink (2007) as the furthest distance for feasible management • Independently developed community plantations with no overhead and transaction costs scenario (discussed in Section 6.2.3.4, Chapter 6) • Royalty adjustment based on EAE values for the alternative incomes from rubber and oil palm plantations
2. External factors	**Specific factors in each scheme**
Timber prices and discount rates	**Community tree-growing scheme:** • Discount rates are affected by the inflation rates at three different economic condition scenarios: worst, moderate and best are analysed based on the historical trend of inflation rates for the past 17 years (1993-2009) (IMF, 2010) • The increases in timber prices: the 3% price increase is based on average major log price increases in Indonesia monitored by ITTO from 1998 to 2009; the 5.5% price increase is based on the increase at wood-trader level; and the 10% price increase is based on the government estimation on the increases
	Community-company partnership scheme: Acacia timber price is affected by the international price for pulp production: two timber price scenarios for acacia were used, i.e. US $ 36/ton and US $ 46/ton following Jurgens *et al* (2005) and Jurgens (2008). The base scenario used a price for acacia timber of USD 20/ton.
B. Other crops	
1. Input factors	**Specific factor**
Productivity	Comparison between current productivity and higher productivity of different crops used in the analysis. Current productivity is based on data collected from households, while higher productivity uses the average of productivity at district level (See Appendix 5-3, section 2b1 for rubber plantation and section 2.c. for oil palm plantation).
2. External factors	**Specific factor**
Prices	For latex from rubber plantations and fresh fruit bunches from oil palm plantations, analysis was conducted for both the normal market prices and lower prices during the global financial crisis (See Appendix 5-3, section 2b1 for rubber plantation and section 2.c. for oil palm plantation).

Sources: Adapted from approaches used by Perkins (1994); Nawir *et al.* (2003b); and Hepburn and Koundouri (2007).

3.3.4. Scenario analysis

In addressing research questions 3 and 4, scenario analysis is used as the method of analysis. Scenario analysis is a powerful method that explores 'what if' questions to explore the potential risks (Schoemaker, 2005; Duinker and Greig, 2007). The main emphasis in scenario analysis is to present descriptions of the future that challenge current assumptions through expanded analytical perspectives (Duinker and Greig, 2007). Scenario development can be an assisting tool: to provide a common understanding of problems and their impacts; to analyse the causes of the problems; to explore and examine policy and management options; and to support the structuring and formulation of goals and objectives (Brauers and Weber, 1988; Jarke *et al.*, 1998; Duinker and Greig, 2007). A scenario is defined as follows:

> *A scenario can be defined as a description of a possible set of events that might reasonably take place. The main purpose of developing scenarios is to stimulate thinking about possible occurrences, assumptions relating these occurrences, possible opportunities and risks, and courses of action* (Jarke *et al.*, 1998).

Based on a deductive approach, the logical approach in developing scenarios follows nine important steps, starting with defining the scope, and includes time frame and scope of analysis. Finally, a quantitative model can be manually developed or based on a computer software modelling package (Table 3-11) (Schoemaker, 2005). In developing scenarios, it is important to recognise some potential pitfalls in dealing with the complexities and uncertainties of reality (Godet, 2000; Schoemaker, 2005). These pitfalls include: failure to develop a clear road map; developing too many scenarios; inappropriate time frame and scope; too much focus on trends; and insufficient attention to drivers (Godet, 2000; Schoemaker, 2005).

Two major categories of scenarios are identified (Godet, 2000): (1) Exploratory, starting from past and present trends and leading to likely futures; and (2) Anticipatory or normative, building on the basis of alternative visions of the future that may be desired or, in contrast, feared. The approach used here in this thesis combines computer-based analysis with a descriptive qualitative approach and focuses on the anticipatory or normative type of scenario (e.g. Ackermann *et al.*, 1997; Galal and Paul, 1999; Notten, 2005). Specifically, the scenario is in the form of a narrative description, supported by a simple diagram in explaining the different components and linked by arrows that are annotated with words like 'influences' and 'constraints' (Galal and Paul, 1999). The application of scenario analysis in responding to research questions 3 and 4 is further described in the following section.

Table 3-11. Processes for developing scenarios

1. Define the scope: setting the time frame and scope of analysis. 2. Identify the major stakeholders: who are the key stakeholders in terms of their interests, roles, and power position, as well as those who are potentially affected. 3. Identify basic trends: issues that have been identified in step 1 concerning the future of environmental issues, such as an increase in environmental regulations. 4. Identify key uncertainties: events with uncertain outcomes that affect issues being dealt with, as identified in previous steps. 5. Construct initial scenario themes: based on identified trends and uncertainties as the main ingredients, the scenario is constructed. A simple approach is to identify extreme worlds by putting all positive elements in one and all negatives in another (Note that positive or negative is defined here relative to the current strategy). 6. Check for consistency and plausibility: Specifically, check for internal inconsistency or lack of convincing story line. 7. Develop learning scenarios: based on steps 5 and 6, general themes should emerge that are strategically relevant and then organise the possible outcomes and trends around them. 8. Identify research needs: further research might need to be conducted in fleshing out the current understanding of uncertainties and trends. Research might be based on secondary sources. 9. Develop quantitative models: based on outcomes from additional research, the internal consistencies of the scenarios are re-examined, and whether certain interactions should be formalised through a quantitative model is assessed.

Source: Schoemaker (2005).

3.3.4.1. Scenario analysis design: impact analysis of policy interventions

Proposed scenarios were identified and analysed taking into account the main underlying impediments affecting the feasibility and commercial competitiveness of small-scale commercial tree-growing. Economic and policy impediments are identified in the initial analysis (Analysis 1, 2 and 3 as explained above). Possible intervention scenarios are generally described in Table 3-12. These interventions are further used to analyse the impacts on: timber productions at the local and national level; marketed volumes; and tree grower incomes (see Section 3.3.4.2).

Table 3-12. **Possible intervention scenarios for each tree-growing strategy**

Two strategies in tree-growing	Scenarios on management, marketing and policy interventions
1. Community tree-growing	• Possible for expansion on degraded lands inside state forests • Secure and full rights for tree growers • Cost-effective timber administration for harvesting, transporting and marketing • Secure and guaranteed market
2. Community-company tree-growing	• Cost-effective timber administration for harvesting, transporting and marketing • Possible for expansion on degraded lands inside state forests
Impact scenario analysis on (see Section 3.3.4.2): • Timber production at national level by strategies • Tree grower incomes	

3.3.4.2. Scenario analysis design: market structure analysis

Following Schwarzbauer and Rametsteiner (2001), the scenario used in analysing the market structure is based on the general market equilibrium theory of demand and supply. Timber demand refers to the concept of intermediate demand, since it is a derived demand derived from finished timber products consumed by wood processing firms with one or many production plants (Andersson and Brannlund, 1987; Pearse, 1990). On the other hand, timber supply models link economic variables with the management practices of forest managers, i.e. tree growers, since modelling timber supply requires an understanding of the optimal allocation of resources important to the production of timber, such as land, labour, and capital (Binkley, 1987).

In response to research question 4, the analysis focuses on determining the gap between potential demand for and supply of a certain category of timber products. This timber production from small-scale commercial tree-growing at national level is analysed as wood supply in a national timber market analysis, specifically in terms of meeting wood demand from the wood processing industry. The main timber species produced by small-scale tree growers define the wood market that their timber production can meet. In considering the specific requirements for timber species demanded by the wood industry, specific characteristics of these wood market niches are analysed.

This analysis is carried out mainly using secondary data from the national level production from various sources; using the results of the analysis of timber production at tree-grower level (Analysis 1), trend scenarios of timber production from small-scale commercial tree-growing are developed. However, for the purpose of this scenario analysis, some information needs to be extrapolated to the national level, such as the timber production that should be extrapolated by using the total areas and numbers of tree growers that are involved for each strategy. The method used is a regression analysis (e.g. Hastie and Source, 1986; Guisan *et al.*, 2002; Armstrong, 2006).

The extrapolation combines cross-section and time series data. Time series data are: total timber demanded by industries for each type of wood production, and potential total area estimated from degraded lands inside state forests that can be developed for small-scale tree-growing. Detailed scenarios are further explained in Chapter 7 (Section 7.2.2). This data is combined with empirical cross-section data from the analysis (mainly from analysis 1) to estimate the contributions from improved scenarios to generating income for the local community.

3.4. Units of analysis and data sources

As explained in Chapter 1 (Section 1.4), the focus of analysis in this thesis is on the two current strategies of small-scale commercial tree-growing inside state forests in Indonesia: community tree-growing and community-company partnership tree-growing (Table 3-13). The unit of the analysis is the management unit level of small-scale tree-growing under these two different strategies. The main determining factors in these strategies are the nature of the management and tenurial arrangements. The nature of management refers to the way the tree-growing areas are managed, viz. under communally managed or under collaborative management arrangements, and between community and company, and/or between community and FDA (Forest District Agency). The tenurial arrangement refers to the property rights attached to lands used by the tree-growers: whether they are over privately owned individual property, within state forest property, or over private company property, which could include the concession rights granted by the state.

Table 3-13. **Units used in analysis of the two strategies for small-scale commercial tree-growing and selected case study sites**

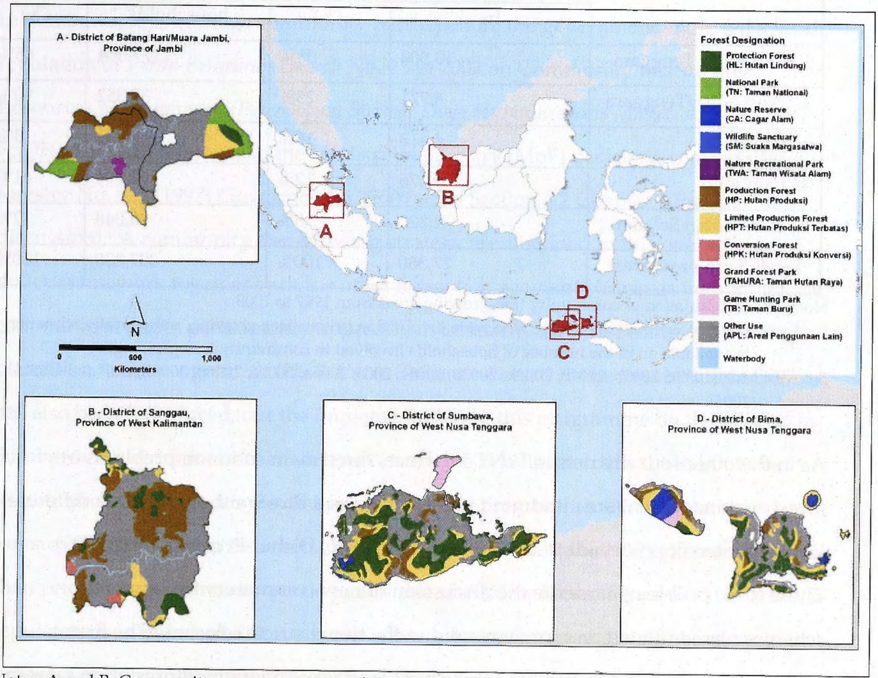
Two strategies	Main characteristics	Selected case study sites
1. Community tree-growing *(Hutan Kemasyarakatan or HKm)*	• Based on collective right from the MoF • Usually for specific purposes, such as reforestation • It is common to be developed under collaborative management with Forestry District Agency	(1) Sumbawa, West Nusa Tenggara (2) Bima, West Nusa Tenggara Species planted in both sites: mainly teak (*Tectona grandis)*
2. Community-company partnership tree-growing *(Kemitraan)*	• Initiated by company to resolve conflicts over land within concessions • Important part of company strategies in securing their timber supply • Based on contractual agreement	(1) Batang Hari/Muara Jambi, Jambi (2) Sanggau, West Kalimantan Species planted: *Acacia mangium*

Sources: Field observation and adapted from: Nemoto (2002); Nawir *et al.* (2003b); Nawir and Manalu (2006); Muktasam and Hakim (2007); Nawir *et. al.*(2007g).

3.4.1. Community tree-growing case studies

The community tree-growing case studies are located in Sumbawa Island, which is part of West Nusa Tenggara Province (See Figure 3-1 for a map of the case study locations). Community tree-growing or *Hutan Kemasyarakatan (HKm)* in West Nusa Tenggara in 2008 was ranked second amongst Indonesian provinces outside Java, with 6,771 ha compared to East Nusa Tenggara with 10,500 ha (Table 3-14) (MoF, 2009i).

One of the reasons West Nusa Tenggara has a significant area developed under community tree-growing is because, in 1986, the state-owned company Perhutani was assigned to develop plantations as part of the government reforestation programme using teak (*Tectona grandis)* as the main timber species (Muktasam and Hakim, 2007; Suwarno *et al.*, 2009). Perhutani has ceased its activities gradually since 1998 and left the plantation areas with no clear arrangements under which the authorised agency responsible could continue to manage the plantations (Muktasam and Hakim, 2007; Suwarno *et al.*, 2009). The local forestry district agency then initiated a partnership programme with communities living in the surrounding villages/areas to continue to manage the existing standing stocks (Muktasam and Hakim, 2007; Suwarno *et al.*, 2009). The research was conducted in two districts: Sumbawa and Bima. The Sumbawa and Bima districts have the highest proportion of forest areas compared to other districts in West Nusa Tenggara (WNT): 49 % for Sumbawa at 533,556 ha and 25 % for Bima at 276,574 Ha.



Notes: A and B: Community-company partnership schemes; C and D: Community tree-growing schemes.
Sources: MoF (1999a; b; 2000a).

Figure 3-1. Map of case study locations

Table 3-14. Area and number of forestry households involved in community tree-growing in five provinces in outer islands of Indonesia

Provinces	Community tree-growing areas [a]		Forestry households [b]	
	ha	(%)	households	(%)
1. East Nusa Tenggara	10,500	38%	177,304	45%
2. West Nusa Tenggara	6,771	25%	37,852	10%
3. Jambi	4,413	16%	11,032	3%
4. Lampung	3,376	12%	162,994	41%
5. Kalimantan Selatan	2,320	8%	8,048	2%
Total (5 top provinces)	27,380	100%	397,230	100%

Notes: a. Accumulation of community tree-growing areas from 1997 to 2008.
b. Based on estimation of those who were involved in private tree-growing, no separate estimation is available on of the number of households involved in community tree-growing.
Sources: MoF (1999c; 2000b; 2001b; 2002b; 2003b; 2004c; 2005; 2006e; 2007e; 2008b; 2009i);MoF and CBS (2004).

As in the other four districts in WNT Province, three main common problems in forestry management are also found in Sumbawa and Bima, although with a different levels of intensity (Suryadi, 2003; Supardi *et al.*, 2006; Dishut Provinsi NTB, 2009). These three problems underlie the discussion of how community tree-growing schemes were initiated and implemented in the two districts selected. The first problems is the high demand for agricultural land, causing high deforestation rates in WNT estimated at 80,000 ha/year since 1998 (Suryadi, 2003). However, the provincial government claimed the deforestation rates had decreased to 3,000 ha/year for the period 2003-2006 as the results from various programmes involving local communities including under *HKm* scheme (Humas NTB, 2011). The total forest area currently comprises 57% (277,869 ha) of the total area in Sumbawa and 67% (227,479 ha) of that in Bima (BPS Sumbawa, 2008; BPS Bima, 2010). These are greater than the available dry farmland areas outside state forests at 210,071 ha in Sumbawa, and especially compared to 112,796 ha in Bima (BPS Sumbawa, 2008; BPS Bima, 2010). Second, many cases of conflict over forest resources have occurred among the different stakeholders at district and national level, for example, due to the conflicting roles of central and district governments under the decentralisation policy (Supardi *et al.*, 2006; Dishut Provinsi NTB, 2009). Third, forest resources are under pressure due to the high expectation by local government that they will contribute to *PAD-Pendapatan Asli*

Daerah (local government revenues) due to the limitations of other natural resources (Supardi *et al.*, 2006).

In Sumbawa, to encourage community participation, the government endorsed a local regulation or *Perda-Peraturan Daerah* No. 25 in 2002 on Community Based Forest Resources Management (*Pengelolaan Sumber Daya Hutan Berbasis Masyarakat-PSDHBM)*[8] with reference to the Ministry of Forestry (MoF) decree on community forestry No. 622 (1997) (Suwarno *et al.*, 2009) (See Section 4.2 Chapter 4 for detailed discussion). A community tree-growing strategy is embedded in this overarching policy framework together with the other forest management strategies involving local communities under participatory approach. Nationally, the latest community-based plantation forest programme (*HTR-Hutan Tanaman Rakyat*) that was released in 2007 has also been introduced, but the implementation of this programme on the ground in Sumbawa District has not been well advanced; the results from this thesis could be used to provide inputs for the development of this programme. On the other hand, forestry development in Bima remains focused on a reforestation programme rather than prioritising community participation and institutional development. The lack of a regulatory framework at district level has been the main impediment to accelerating progress in community based forestry management (CBFM), including the community tree-growing strategy.

The local government of Sumbawa is considered to be a progressive district in WNT in comparison with other provinces, as is demonstrated by its umbrella law promulgated to support community-based forest management (CBFM) initiatives. Under this umbrella, community cooperatives have clear rights and responsibilities in their participation in community-based forest management (Nawir *et al.*, 2007b; Suwarno *et al.*, 2009). There were two case studies of community tree-growing initiatives included. First, the initiative implemented under the *Perda PSDHBM-Peraturan Daerah Pengelolaan Sumber Daya Hutan Bersama Masyarakat* in Semamung Village; and second, the National Social Forestry Programme (NSF Programme) developed in Lamenta Village. In the District of Bima case (Section 4.3 Chapter 4 for detailed discussion).

---

[8] In short, for further discussion, the term *Perda PSDHBM* is used in this thesis.

There two programmes included. The first was the coppice regeneration project initiated by a local community group in Ntori. The second was the self-managed *HTI-Hutan Tanaman Industri swadaya* in Nggelu.

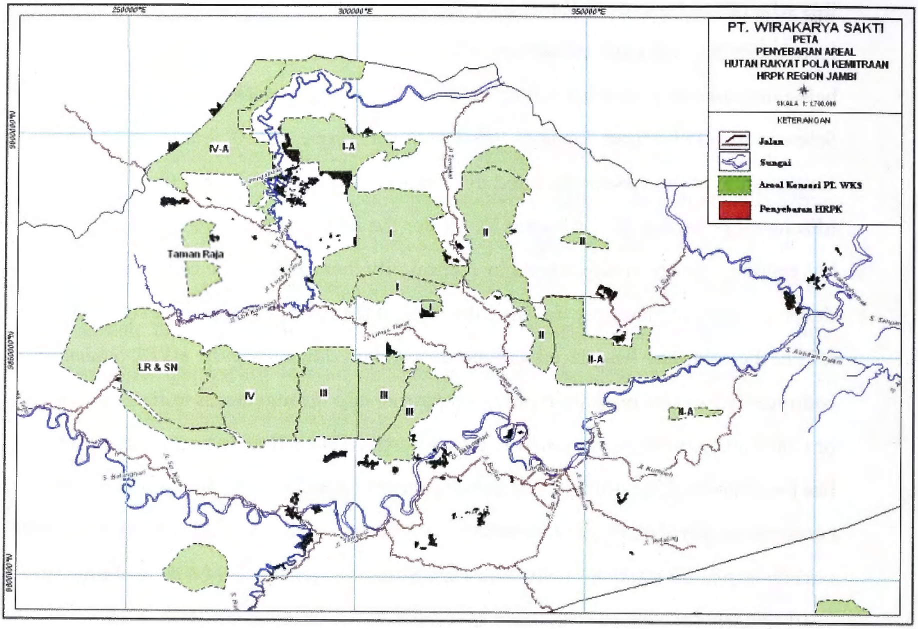
Alternative land use options with the highest opportunity costs in Sumbawa are a combination of paddy and mungbean, or turmeric and mungbean (Nawir *et al.*, 2007b; Suwarno *et al.*, 2009). In Bima, these options are a combination of cashew and candle nuts, or paddy, corn, soybean and sesame (Puspitasari, 2003; Nawir *et al.*, 2007b; WWF and Dishut Kab. Bima, 2009). See Section 4.4 of Chapter 4 for further discussion on the financial analysis. Discussion on basic information used in the Cost and Benefit Analysis (CBA) are presented in Appendix 4-3.

There are limited timber marketing opportunities in both districts. In Sumbawa, harvested timber is mainly bought by local small furniture makers and brokers from Java (mainly East and Central Java), who are looking for cheap teak timber to sell to wood processing companies. In Bima, only the local wood-processing cottage industries buy the teak produced.

3.4.2. Community-company tree-growing case studies

Since 1999/2000, due to increased community land claims in their concession areas during the reformation era, companies, particularly Industrial Timber Plantations companies *(HTI-Hutan Tanaman Industri)*, have initiated partnerships with communities to reforest the land. Currently, the levels of partnerships developed by companies vary from providing assistance with seedlings to collaboration under legal contractual agreements. Building on these initiatives, the partnership arrangement is expected to be based on more equal negotiating power, and bounded by a mutually beneficial partnership agreement.

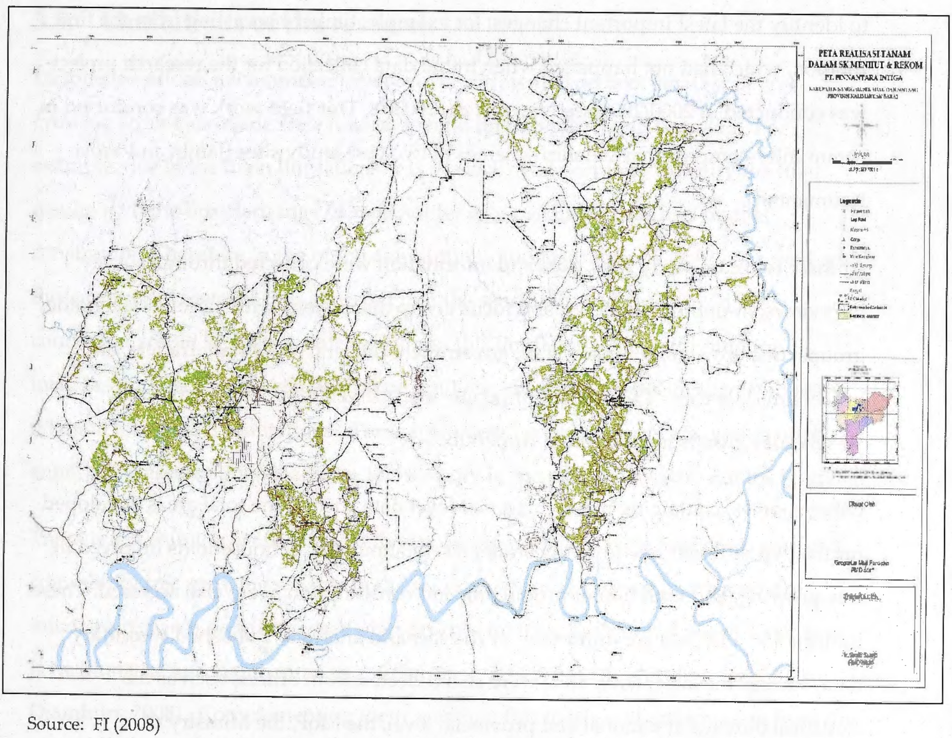
The community-company partnership scheme initiated by the two companies included in this research represents two contrasting cases. The first, the Jambi scheme, represents situations with a secure market that are located quite close to tree growers' plantations. The company, Wirakarya Sakti (WKS), also holds its own concession areas as the main plantations for its sources of wood, in addition to a plantation that has been developed under a partnership scheme. WKS' main motivation in developing this scheme has been to establish good relations with the community by responding to its requests (e.g. for road infrastructure) (Nawir *et al.*, 2003b). There are two schemes being implemented by WKS, which are the *HRPK-Hutan Tanaman Pola Kemitraan Scheme* and *HTPK-Hutan Tanaman Pola Kemitraan Scheme*. *HRPK Scheme* is actually a continuation of the scheme initiated in 1995 under the Farm Forestry Credit Scheme (discussed in Section 5.2.1 Chapter 5). Under the *HTPK* scheme, the company's focus has been to manage areas claimed by community members, so the company could develop acacia plantations. Taking into account the slow progress in developing the *HTPK*, the company has placed a higher priority on developing the *HRPK Scheme* or community forestry plantation based on partnership arrangements initiated on private or community-owned land (outside state forests). This is largely because the company has been more successful with the development of partnership schemes outside their concessions, particularly on community member privately-owned land. By 2007, these partnership areas totalled 11,810 ha; by 2008, this had grown to 14,805 ha involving 7,401 households, with the addition of some 3,000 ha in one year(Nawir and ComForLink, 2007; WKS, 2008). With promising developments in this partnership scheme, the company has expanded its partnership programme in the neighbouring provinces, such as South Sumatra Province, as a way of finding more land to compensate for the area under conflict inside the state forests (See Figure 3-2 for development areas under partnership scheme). See Appendix 5-1 for additional information on company profile.



Source: WKS (2008)

Figure 3-2. Areas for partnership scheme development by WKS in Jambi

On the other hand, the second case in Sanggau, West Kalimantan, developed by Finnantara Intiga (FI), represents the situation of a company without its own plantation concessions, and therefore with the development of plantations jointly with the community being the only way to obtain the wood supply for its factory located further away on another island (Sumatra). The company has undergone several major management changes. The latest change was in 2004, when Stora Enso, as the major shareholder, sold the company to Global Forest-GF (Sinar Mas Forestry-SFM). Currently FI manages a total concession area of 388,000 hectares (Schneck, 2008; FI, 2008). An additional 89,000 hectares was added to the 299,700 hectares of the initial concession area setup under the MoF Decree following the governor's recommendation (Schneck, 2008; FI, 2008). The concession areas are located in two districts of West Kalimantan, Sanggau/Sekadau (200,474 hectares) and Sintang (99,226 hectares) (See Figure 3-3 for development areas under partnership scheme) (FI, 2008). In both districts, a total of approximately 60,000 people in 110 villages live within the company's concession area (Miettinnen and Lammi, 2002). In early 2000, about 80,056 hectares (27%) of the total concession area could not be utilised because they overlapped areas used for oil palm plantations, residences, some areas with particularly high population density, and primary forest areas (Nawir *et al.*, 2003b). Another study reported that in 2008, the area that could not be planted had accumulated to 160,403 hectares. This included a conservation area, infrastructure, local tree species and customary forest *(Tembawang)*, rubber trees, a disputed area and occupied farmland (Schneck, 2009). See Appendix 5-2 for additional information on company profile.



Source: FI (2008)

Figure 3-3. Partnership scheme areas developed by FI in Sanggau/Sekadau and Sintang, West Kalimantan

Alternative land use options with the highest opportunity costs in Jambi are oil palm plantations, managed either in partnership or by independent small-scale growing management (field observations, P3SE, 2001; Nawir *et al.*, 2003b). In Sanggau, alternative land use options are traditional (jungle rubber) and high-yield rubber plantations (field observations and Nawir *et al.*, 2003b). See Section 5.5 of Chapter 5 for further discussion on the financial analysis. Discussion on basic information used in the Cost Benefit Analysis (CBA) are presented in Appendix 5-3.

3.4.3. Data sources: project data, empirical case study, and published secondary information

To complement the data previously collected from the four sites in the two projects, additional data was collected during PhD field work in December 2008 and January 2009. This field work on the community-company partnership scheme was conducted to identify the latest important changes; for example, timber harvesting from the first rotation, which had not happened when initial data collection for the research project was conducted in 2000/2001(see Nawir *et al.*, 2003b). This field work was conducted in community-company partnership schemes at two case study sites (Jambi and West Kalimantan).

At these two case study sites, data and information were collected through survey interviews, in-depth interviews, and focus group discussions with various stakeholder groups: tree growers, company staff, government officers, NGO staff, traders, and brokers/middle-men. The number of people interviewed representing different stakeholder groups is included in Appendix 3-1.

Other sources, containing mainly national-level data such as the total areas developed for the two different tree-growing strategies, total number of households involved in tree-growing, and total timber production and consumption, were also accessed. These information and data are important for the scenario analysis. Published secondary data, such as the latest *HKm* area, were also collected from offices, such as the statistical bureaus at national and provincial level, the MoF, the Ministry of Agriculture, and universities. Data used for the financial analysis were compiled from different sources. Most economics data and supporting information, such as planting pattern, labour allocation, and number of standing stocks managed by each tree grower, was collected from the survey using structured questionnaires, direct field observations, the FGD, as well as relevant documentation, such as the government budgeting report, to estimate government expenses. At the end of the research, assumptions and preliminary results were verified with different stakeholder groups through the FGD at village level, and with members of the wider community, and through workshops at district level, such as with tree growers, government officers, and traders. In total, ten meetings at village level and four at the district level, were held. However, adjustments were required subsequently, specifically to take into account the inflation rates in the adjustment of prices. Continued consultations by emails and phones with stakeholders relevant to the case studies were conducted as necessary. Detailed information and data that were used from previous projects and during PhD research are presented in Table 3-15.

3.5. Limitations of the research

Despite the efforts to comprehensively cover different aspects of small-scale tree-growing strategies inside state forests, several limitations should be noted. For example, one of the main limitations was the lack of opportunity to verify the final results with the broader range of stakeholder groups, due to time and budget constraints. Therefore, some of the assumptions and justifications were not tested with these groups. However, it is expected that the sensitivity and scenario analysis conducted would be appropriate to address this limitation. Another limitation includes the costs and revenues data on land use alternatives, specifically smallholder oil palm and rubber plantations. These were based on secondary data, which might entail some assumptions that were known only to the researchers who did the study.

There is a possibility for bias in this thesis' research analysis from using two sites of a community tree-growing scheme in the same province. However, there has been intensive research on this tree-growing practice in other parts of Indonesia, such as in Java, Sumatra, and Kalimantan (e.g. Colchester, 2002b; Safitri, 2006; Hindra, 2007; Djamhuri, 2008). Complementing the research in this thesis with information from this wide range of literature is an important part of the analysis. The district of Sumbawa is a focus because it is among the few districts in Indonesia that have proactively initiated participatory development in a policy framework for local community-based forest management, which has empowered the local communities' involvement in state forest management.

Table 3-15. Information and data that were used from previous projects and during PhD research

(1) Primary data used from previous projects (2000-2005)		
Key aspects in the analysis [a]	Sources of information under the two schemes	
	Community tree-growing	Community-company partnership
(1) Motivating factors and tree-growing objectives	Specific information from project reports and FGD/workshop notes as included in the references list	Specific information as included in the working paper and publication led by myself and published by CIFOR and as journal papers
(2) Endowment characteristics	Database on households and their land ownership description	
(3) Institutional and policy conditions	Specific information from project reports and FGD/workshop notes as included in the references list	Companies' documents and cooperative profiles
(4) Financial analysis: net revenues, benefit and cost structures	Databases on level of inputs used in tree-growing and for inter-cropping practices; standing stocks and potential timber productions; areas managed; and investment costs provided by government	None from previous data was used, since the partnership arrangements had been changed
(2) Primary data collected during the PhD research (2007-2012)		
Key aspects in the analysis [a]	Sources of information under the two schemes	
	Community tree-growing	Community-company partnership
(1) Motivating factors and tree-growing objectives	Updating information was based on email and phone communications with key stakeholders in the two districts (Sumbawa and Bima) and desk research. Examples of specific information include: recent prices for various production inputs used and costs of various activities in tree-growing and inter-cropping.	Data and information collected during the revisited field work (December 2008-to January 2009) through household survey, in-depth interview and FGD
(2) Endowment characteristics		
(3) Institutional and policy conditions		
(4) Financial analysis: net revenues, benefit and cost structures		
(5) Potential impacts on livelihoods		
(3) Secondary data collected during the PhD research (2007-2012)		
Key aspects in the analysis [a]	Types of data and information	
(1) Institutional and policy conditions	Various MoF documents on policy and regulations as included in the reference lists	
(2) Financial analysis: net revenues, benefit and cost structures	Timber volumes by species and year of growth from various sources as included in Appendix 4-3; Consumer Price Index (CPI) 1994-2009 from *BPS-Biro Pusat Statistik* (Central Bureau of Statistics); inputs for production and productivity figures of crops used in inter-cropping/alternative investments	
(3) Potential impacts on livelihoods	The average annual household income in rural areas of West Nusa Tenggara, Jambi and West Kalimantan Provinces (BPS, 2005b)	
(4) Potential market for smallholders timber production and areas for development	Type of wood-processing industry, annual capacity and timber supply required in 2010 at national level and different regions in Indonesia from various sources (see Table 7-1, Appendixes 7-1 to 7-9); distribution of wood-based production by types and islands from MoF (2010c); national wood production under different strategies from various sources (see Figure 7-1); targeted areas set under different programmes involving communities from various sources (see Table 7-3)	

Note: a. See Table 3-5 for specific variables under various key aspects.

3.6. Conclusions

Guided by the research questions defined in Chapter 1 and framed by the conceptual framework discussed in Chapter 2, this Chapter 3 explains the research design in detail, including the methodology used in this thesis in addressing specific research questions using empirical case study data and other documentary sources. The research design is based on comparative case study of community tree growing in two districts of West Nusa Tenggara Province, and two of community-company partnerships in Jambi and West Kalimantan Provinces. With this comprehensive understanding and case study platform, the next four chapters explain the results of the analysis in term of the four research questions.

Chapter 4. Results and discussion: community tree-growing schemes

4.1. Introduction

This chapter is the first of two that discuss the results of the analysis of the socioeconomic performance of the three tree-growing strategies as guided by research questions 1 and 2. Specifically, this chapter covers the results and discussion for community tree-growing strategies based on two selected case study sites, at Sumbawa and Bima Districts, of West Nusa Tenggara (WNT) Province. The community tree-growing schemes in Sumbawa and Bima were part of the government's management strategy for rehabilitating degraded state forests under state-nested collaborative arrangements (see Section 2.4.1.2 in Chapter 2).

The discussion of community tree-growing schemes in this chapter is organised into four main sections. The first section discusses the community tree-growing scheme in Sumbawa (Section 4.2). As mentioned in Section 3.4.1 of Chapter 3, this is based on a case study analysis of the implementation of the community tree-growing scheme, focussing on two programmes: the initiative implemented under the *Perda PSDHBM-Peraturan Daerah Pengelolaan Sumber Daya Hutan Bersama Masyarakat* (District regulation on the collaborative forest resource management with the community) in Semamung Village; and the National Social Forestry Programme (NSF Programme) developed in Lamenta Village. The second section discusses the Bima case (Section 4.3). The discussion in this district was also based on two programmes. The first was the Coppice Regeneration Project initiated by a local community group in Ntori. The second was the self-managed *HTI-Hutan Tanaman Industri swadaya* in Nggelu.

The discussion in both sections explores the overarching policy framework and the institutional, tenurial, and management arrangements. The third main section in this chapter discusses the results from the financial analysis (Section 4.4), comparing the management in Sumbawa and Bima. The last section (Section 4.5) in this chapter discusses the implications of the current policy framework, institutional and management arrangements for socioeconomically feasible tree-growing management to be compared with the other tree-growing strategies discussed in Chapter 5.

4.2. The community tree-growing scheme under the state-nested system in Sumbawa

As discussed in Section 3.4.1 of Chapter 3, the district of Sumbawa is one of few districts that have proactively initiated participatory development in a policy framework for local community-based forest management, which has empowered the local communities' involvement in state forest management. The other districts include: Wonosobo (Central Java), Districts of West and North Lampung, and Tanggamus (Lampung Province), and Konawe (Southeast Sulawesi) (ARuPA, 2002b; Adi *et al.*, 2004; Cahyaningsih *et al.*, 2006; Suwito, 2007; Watala, 2008; Royo *et al.*, 2010).

A shift from state-based to community-based forest management was increasingly viewed, by government and other parties such as NGOs and the international community, as the solution to the increasing conflicts over forest resources between local communities and local authorities or concessionaires (Suryadi, 2003; Nawir *et al.*, 2003b; Suwarno *et al.*, 2009), particularly after the Reformation Era began in 1998 and the decentralisation policy was imposed in 1999 (Jabir and Julmansyah, 2003). The increasing conflicts after the Reformation Era began were considered to be the main reasons behind the initiation of *Perda* in these particular districts, including in Sumbawa (Suryadi, 2003; Julmansyah, 2006).

4.2.1. Overarching policy framework, institutional and management arrangements, and the dynamics of the tenurial conditions

Two relevant historical contexts that affected the current management in Sumbawa are discussed in this section: first, district and national level policy changes (Section 4.2.1.1); second, the participatory process in developing *Perda PSDHBM* (Section 4.2.1.2). These historical contexts have affected the dynamics of tenurial conditions as discussed in Section 4.2.1.3.

4.2.1.1. Historical context affecting current management: national and district level policy changes

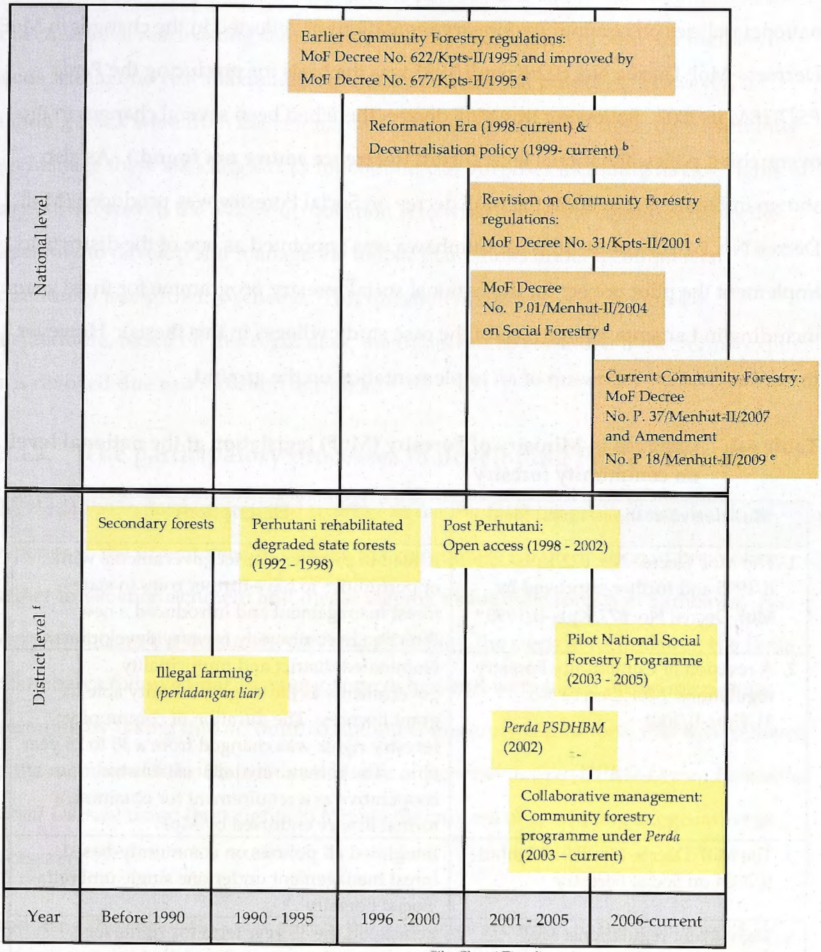
The Ministry of Forestry assigned Perhutani in 1986 to rehabilitate degraded state forests in West Nusa Tenggara and East Nusa Tenggara (Supardi *et al.*, 2006; Muktasam and Hakim, 2007). The rehabilitation of state forests was implemented under the framework of *HTI* development involving local communities, who mainly worked as paid labourers for tree-planting and maintenance, and/or as *pesanggem*, who were community members given the opportunity to carry out inter-cropping between the planted teak trees (FORKOD HKm NTB & PKSK Unram, 2001; Supardi *et al.*, 2006). In return, the community members maintained and supervised the main timber crops with no expectation of enjoying the benefits from tree harvesting (Supardi *et al.*, 2006) (See Appendix 4-1 for more detailed description of the assignment given to the Perhutani to rehabilitate degraded state forests).

When Perhutani finished its assignment in 1998, it was planned that the Forestry District Agency (FDA) would take over the follow-up management, the main aim of which was to provide more significant roles for community members in state forest management (FDA Sumbawa staff, 02/09/2003; Jabir and Julmansyah, 2003). However, this plan was based only on an agreement between Perhutani and DG RLPS (Directorate General of Land Rehabilitation and Social Forestry), MoF in Jakarta, and was never translated to district level nor involved the FDA itself (Supardi *et al.*, 2006). Further, the FDA was unprepared and under-resourced to take this on in terms of budget and human resources capacity (FDA Sumbawa staff, 04/09/2005; Sabani *et al.*, 2003).

Over a period of about four years, state forest management in Sumbawa was abandoned and the planted forest became open access property (see Figure 4-1) (FDA Staff, pers. comm., 2 September 2003; Supardi *et al.*, 2006). This open access condition resulted in about 25% of the area being deforested due to forest encroachment for illegal farming following illegal timber cutting (FDA Sumbawa staff, 01/09/2003). (See Box 6-1 in Chapter 6t for estimated economic losses from illegal logging of standing stock planted by Perhutani). About 24.3% of those involved in the survey conducted by CIFOR and WWF claimed that they took possession of land during the open access period from 1998 to 2000 (CIFOR and WWF Indonesia survey data, 2005). Further, *DPRD-Dewan Perwakilan Rakyat Daerah* (District level House of Representative) received many requests from community members to utilise the state forest lands, mostly for farming (Jabir and Julmansyah, 2003; Supardi *et al.*, 2006).

The district government of Sumbawa initiated the local regulation *Perda* No. 25 in 2002 on Community Based Forest Resources Management (Jabir and Julmansyah, 2003; Sabani *et al.*, 2003; Suryadi, 2003). The specific objective of the *Perda* was to provide community members collectively with access to state forest lands, particularly to encourage full participation in maintaining and supervising the state forests by those who lived on land surrounding the state forests (Jabir and Julmansyah, 2003; Sabani *et al.*, 2003; Julmansyah, 2006).

As shown in Figure 4-1, the initiation of the *Perda* occurred after the Reformation Era, and the decentralisation policy under Law 22/1999 on regional administration, which was effectively implemented after 2001. The beginning of the Reformation Era provided a greater chance for communities to demand their rights to be involved in state forest management. Under the decentralisation policy, district governments, including in Sumbawa, have greater authority to self-regulate their natural resources including drawing more revenue from the utilisation of natural resources.



File: Chap 4 Time line

Sources: Adapted from: (a) Hindra (2007), (b) Safitri (2006) and Suwarno *et al.* (2007), (c) MoF (2001a), (d) MoF (2004b (e) MoF (2007b; 2009d), (f) FDA Sumbawa staff, pers. comm., 01/09/2003, 04/09/2005, PKSK & BRLKT (2004), FGD in Lamenta (25/05/2005), FGD in Semamung (26/05/2005), and Supardi *et al.* (2006).

Figure 4-1. Timeline of historical national policy and management changes affecting current community tree-growing scheme in Sumbawa

However, the development of the *Perda* was also closely related to the changes in national policies on community forestry regulations as reflected in the changes in MoF Decrees. MoF Decree No. 622/Kpts-II/1995 was the basis for producing the *Perda PSDHBM* in 2002. Following this MoF decree, there had been several changes in the overarching policy at national level (**Error! Reference source not found.**). As also shown in Figure 4-1, in 2004, the MoF decree on Social Forestry was produced (MoF Decree No. P.01/Menhut-II/2004). Sumbawa was appointed as one of the districts to implement the pilot project for the national social forestry programme for three years, including in Lamenta village (one of the case study villages in this thesis). However, there was no clear follow-up of an implementation on the ground.

Table 4-1. Changes in Ministry of Forestry (MoF) legislation at the national level on community forestry

MoF decree at the national level	Descriptions
1. The MoF Decree No. 622/Kpts-II/1995 and further improved by MoF Decree No. 677/Kpts-II/1995 [a]	Aimed to provide district governments with opportunities to have further roles in state forest management and introduced a new direction in community forestry development.
2. A revision of Community Forestry regulations: MoF Decree No. 31/Kpts-II/2001	Nominated district and municipality governments as the single authority able to grant licences. The duration of community forestry rights was changed from a 35 to 25 year term. The community must establish a cooperative as a requirement for obtaining a formal licence endorsed by MoF.
3. The MoF Decree No. P.01/Menhut-II/2004 on Social Forestry	Integrated all policies on community-based forest management under one single umbrella 'Social Forestry'. [b]
4. The current regulations: MoF Decree No. P. 37/Menhut-II/2007 and Amendment No. P 18/Menhut-II/2009	Reinstated the 35 year term for rights for community forestry and cancelled the decree on Social Forestry.

Notes:
a. This was used as a reference by district government to produce the *Perda PSDHBM* in 2002.
b. The decree on social forestry was terminated by the later MoF Decree on community forestry (No. 4.)
Sources: Adapted from Hindra (2005; 2006; 2007) and Safitri (2006).

The current regulation on the implementation of community forestry is based on MoF Decree No. P. 37/Menhut-II/2007 and Amendment No. P. 18/Menhut-II/2009 (MoF, 2007b; 2009d). A community as a group can be granted the usufruct rights for 35 years to manage a certain allocated area following an approved proposal submitted by the community as a group to the Minister of Forestry. Such rights can be renewed based on the results of five-yearly evaluations. As part of these rights, the community can collectively harvest existing standing stock up to a maximum of $50m^3$ for their own needs within one year maximum, but not for commercial purposes. However, if standing stock were from the community's own planted timber trees, the community can manage these standing stocks for commercial purposes including having rights to harvest. However, the follow-up question is to what extent the community has the capability to develop and manage the timber plantations under a commercial community tree-growing scheme. This question is addressed in Section 4.4. Furthermore, based on this regulation, the rights can be rescinded if the permit expires or is revoked due to a violation of rights.

4.2.1.2. The participatory processes in developing *Perda PSDHBM*

The *Perda PSDHBM* was initiated to serve as the overarching policy framework in response to the urgent need to involve the community's participation in preventing further forest encroachment and illegal logging inside state forests in Sumbawa. As interpreted from the document on *Perda PSDHBM*, the steps in formulating the *Perda* in Sumbawa followed participatory approaches, and were based on six main steps, beginning by taking into account/compiling community aspirations; this was followed by the members of the District-level House of Representative (*DPRD-Dewan Perwakilan Rakyat Daerah)* using their rights to initiate the process of producing a legislation as necessary.

Producing this legislation was part of the privileges accorded to the members of DPRD, specifically the right of (legislative) initiative. Learning from cases of the massive community resistance towards legislation produced by other district governments, DPRD in Sumbawa decided to use a participatory approach in producing its legislation. The processes in producing the *Perda* then involved scoping the issues, doing a comparative study, consultations at community level and public consultations (Jabir and Julmansyah, 2003; Sabani *et al.*, 2003) (see Appendix 4-2).

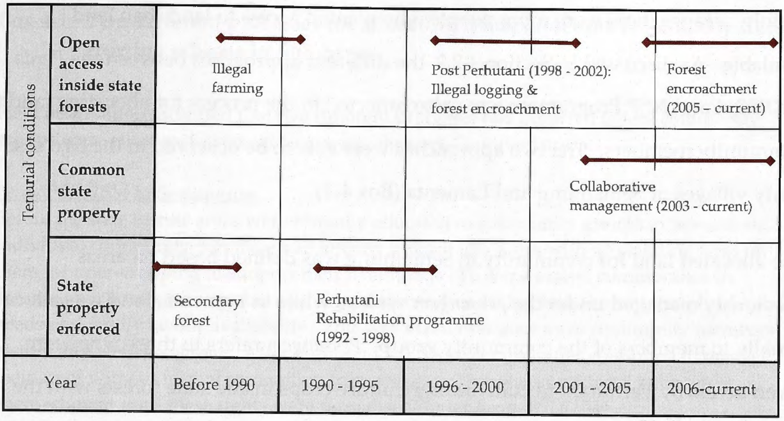
Positive insights were received from community groups that expressed their appreciation for the opportunity to be involved in producing the *Perda PSDHBM* (FGD in Semamung village, 26/05/2005). However, some sceptical comments were also received from representatives of district government, who were not sure about the sustainability of forestry management under collaborative management that involved communities (FDA Sumbawa, WWF Indonesia Nusa Tenggara Programme and CIFOR, 2005).

The participatory approach in defining the *Perda PSDHBM* is an important part of initiating and implementing the community tree-growing scheme. The *Perda PSDHBM* in Sumbawa, similar to the *Perda* initiated in Wonosobo District and three districts in Lampung, is the translation/transformation of the national policy on community forestry into an overarching policy framework at district level.

As illustrated in Figure 4-1 (timeline), in implementing this *Perda PSDHBM*, a community forestry programme under collaborative management was initiated in 2003; not long after, in 2004, Sumbawa was chosen as the pilot project area for implementing the National Social Forestry Programme (NSFP) due to that local government's initiative in producing the *Perda PSDHBM*. These two community-based tree-growing programmes under the *Perda PSDHBM* (based on village case study in Semamung) and NSF Programme (based on village case study in Lamenta) are the foci of the research for this thesis. The institutional, management and tenurial arrangements of community tree-growing scheme in Sumbawa are further discussed in the following sections.

4.2.1.3. The dynamics of the tenurial conditions

The tenurial conditions in Sumbawa underwent several changes. Before 1990, the state forest areas became open access due to the lack of specific local rules for the use of forest lands on the grounds that they were mutually recognised by different stakeholders, including surrounding local communities (Figure 4-2). Under open access conditions, intensive illegal farming was occurring in most local communities, which led to degradation of forest conditions (FDA Sumbawa staff, 02/09/2003). Perhutani enforced the forest's state property status and limited access by local communities to involvement as labourers in planting and maintaining the trees planted as part of rehabilitation efforts in 1992 to 1998.



File: Chap 4 Time line

Sources: FDA Sumbawa staff, pers. comm., 01/09/2003, 04/09/2005, PKSK & BRLKT (2004), FGD in Lamenta (25/05/2005), FGD in Semamung (26/05/2005), and Supardi *et al.* (2006).

Figure 4-2. The changes in tenurial conditions following the management changes

After Perhutani left in 1998, tenurial conditions became open access again (1998–2002) with more incentives to carry out illegal logging due to the commercial value of the timber planted, both by people residing outside the villages and the villagers themselves (Supardi *et al.*, 2006). However, the local communities were more interested in utilising the areas after they had been illegally logged for farming, mainly for agricultural crops. Under the formal collaborative arrangement implemented following the *Perda PSDHBM*, tenurial conditions were improved and managed under collaborative agreement between community groups and the FDA as common state property (2003 to present). Management was mainly based on clearly defined boundaries established through participatory mapping and the clearer common norms and rules set out in *Perda PSDHBM*. As further discussed in Section 6.2.3.1 of Chapter 6, tenurial conditions have significant impacts on the extent to which community members have secure rights to long-term benefits from timber management.

The criteria of eligibility to be granted rights under *Perda PSDHBM* included being landless and/or owning limited parcels of land. However, there was no clear threshold for the minimum area of land to be considered as 'limited'. Despite the criteria having been developed under participatory processes, there was a risk of a social gap widening between those who had land allocated and those who missed out. This was mainly because there were more people who wanted access to land than land available. As discussed in Section 4.2.2, the different approaches between the *Perda PSDHBM* and NSF Programme were also reflected in the process for allocating land to community members. The two approaches were able to be observed in the two case study villages of Semamung and Lamenta (Box 4-1).

The allocated land for community in Semamung was defined based on areas previously managed under the *pessangem* system, while in Lamenta, land was allocated equally to members of the community group. *Pessangem* refers to those who were given access by Perhutani to cultivate agriculture crops inside state forests with the obligation of maintaining the forest areas including timber trees (Supardi *et al.*, 2006). This practice was also commonly implemented by Perhutani in their areas in Java (Adi *et al.*, 2004). The two different approaches affected the results of the financial analysis, as discussed in Section 4.4.

Under both schemes, conditions for revoking rights included abandoning the land and carrying out destructive actions affecting the sustainability of the forest resources and the surrounding environment. Rights would also be revoked if the community used the land as collateral for obtaining loans, or for selling or handing over the land to other people. However, rights can only be transferred to their heirs under *Perda PSDHBM*. This was one of the most important conditions for the rights being granted from the community's perspective (FGD in Semamung village, 26/05/2005).

Box 4-1. Two different processes for allocating lands under the community tree-growing scheme in Sumbawa

Field observation indicated that two different processes had occurred before community groups were given endorsement to manage these ex-Perhutani areas.

Perda PSDHBM in Semamung:

Before the state forests areas were formally allocated to community groups in Semamung, individual community members had already utilised idle areas with no standing trees on them for inter-cropping to support their livelihoods. To some extent, communities in Semamung chose a manageable size of land themselves taking into account their livelihood needs and family labour availability. This was mainly because most community members historically were *pessangem*. After Perhutani left, these communities continued to manage their areas without formal recognition from the state; that was considered to be forest encroachment until these rights were formalised under *Perda PSDHBM*.

NSF Programme in Lamenta:

In Lamenta, forest lands were allocated by the Forestry District Agency under the National Social Forestry Programme in 2004. In this village, an area of 25.5 ha was allocated equally to 18 community groups with average membership of 20–25 people each. However, the areas had already been heavily illegally logged. Other studies indicate that some community members were actually involved in illegal logging activities after Perhutani left the areas.

Sources: Adapted from PKSK & BRLKT (2004); Supardi *et al.* (2006); Muktasam and Hakim (2007).

4.2.2. Two main programmes for a community tree-growing scheme in Sumbawa

As discussed in Chapter 3 (Section 3.4.1), the case study analysis focuses on two villages: Semamung, which has been implementing the community tree-growing scheme under *Perda PSDHBM*, and Lamenta, which has been implementing the NSF Programme. The forest areas managed under both these schemes were previously managed by the state-owned company, Perhutani, with a total of 18,160 ha (Julmansyah *et al.*, 2005; Muktasam and Hakim, 2007). This section compares these two different processes of obtaining the forest rights, and the management arrangements and foci under the two schemes.

4.2.2.1. District government initiative: the community tree-growing scheme under the Perda PSDHBM

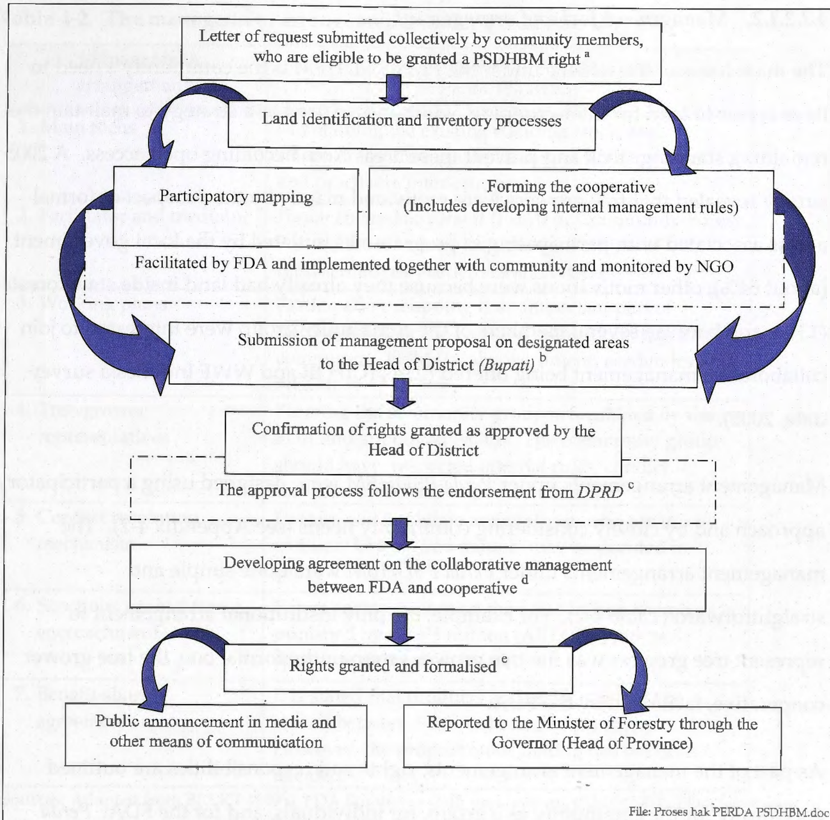
This section discusses two main points: the institutional arrangements, and the management foci and arrangements.

4.2.2.1.1. Institutional arrangements

The procedure for granting rights under the *Perda PSDHBM* is mainly based on community requests. Under *Perda PSDHBM*, there are at least seven steps required before a community can be collectively granted formal rights for 35 years to manage the areas. Figure 4-3 shows these important steps. First, the letter of request is submitted to the FDA by those eligible to be granted the rights, such as landless community members. The land should be identified and an inventory process undertaken for the proposed areas followed by participatory mapping, and forming a community group as the responsible group to be granted the rights.

In the initial processes, the community group also needs to develop internal management rules including sanctions and fines for any rights violations, as well as conflict resolution mechanisms as agreed by all members. All of this detailed information is included in the proposal submitted to the FDA. The Head of District provides the approval based on the endorsement from the *DPRD*. The FDA will then initiate the development of a collaborative management agreement between the FDA and the community group. This agreement outlines the rights and responsibilities of the two parties. The whole process could take about one to two years before the community finally receives their management rights.

The role of the *FHM-Forum Hutan Masyarakat* (community forestry forum) is quite significant during the initiation and implementation of the application process. For example, *FHM* has important roles as the mediator and facilitator, and in providing advice and recommendation on various aspects of the implementation of *Perda PSDHBM*. *FHM* has also roles in conducting monitoring and evaluation. Members of the *FHM* include multi-stakeholder groups, such as government representatives, academics, NGOs, and community member representatives.



Notes:

a. To be submitted to FDA on behalf of the Head of District (*Bupati*); criteria for eligibility include having or possessing limited land.
b. Proposal to include: comprehensive potential description of the proposed areas, detailed background information about the community group members, and internal community group rules for managing the proposed areas.
c. DPRD-*Dewan Perwakilan Rakyat Daerah* (Regional House of Representatives).
d. Witnessed by *FHM-Forum Hutan Masyarakat* (Community forestry forum), Head of Village, and Village Representative Body.
e. Rights include management of timber growing and inter-cropping, granted for 35 years (with 7 years' probation) and can be renewed for another 35 years.

Source: Adapted from Sabani *et al.* (2003).

Figure 4-3. Processes required in applying for rights under the *Perda PSDHBM*

4.2.2.1.2. *Management foci and arrangement*

The main focus of the scheme under the *Perda PSDHBM* is the community's need to have access to land for inter-cropping, which is also used as a strategy to maintain the remaining standing stock and prevent these areas from becoming open access. A 2005 survey revealed that tree growers were motivated mainly by the prospect of formal access associated with participating in programmes initiated by the local government (about 64%); other motivations were because they already had land inside state forests (13%), and because several members of the community group were interested to join collaborative management being offered (23%) (CIFOR and WWF Indonesia survey data, 2005).

Management arrangements under *Perda PSDHBM* were designed using a participatory approach and by closely considering community needs (see Appendix 4-2). The management arrangements under *Perda PSDHBM* were quite simple and straightforward (Table 4-2). For example, the only institutional arrangement to represent tree growers was the tree grower group or the formal one, the tree grower cooperative, facilitated by the FDA.

As part of the management arrangements, rights and responsibilities are outlined specifically for the community as a group, for individuals, and for the FDA. *Perda PSDHBM* outlined rights and responsibilities with a broader scope of forest resources management. The community has the right to manage forest areas, inside both protection and productive zones. The choice of crops is then defined based on the forest category, such as long-term perennial non-timber species in protection forest, and timber species that can be used in production forest, such as teak and mahogany. As part of management arrangements, the community also has the right to receive a share from timber and non-timber production according to the benefit-sharing agreement.[9]

[9] See further Nawir *et. al.* (2007b).

Table 4-2. The management arrangements under Perda PSDHBM

Management arrangements	Programme under *Perda PSDHBM*
1. Main focus	Maintaining the existing standing stock, and reforestation through replanting of timber species and practising inter-cropping.
2. Facilitator and mediator	*Forum Hutan Masyarakat (FHM)* or Community Forest Forum, the members included: government representatives, academics and NGOs.
3. Working plans	Participatory mapping is an important part of putting together the working plans (done together by community, FHM (local government, academics and NGOs).
4. Tree-grower representatives	Forming the community group is facilitated by the FDA and appointed NGOs. The community group should have respected internal rules, conflict resolution mechanisms, and caretakers.
5. Conflict resolution mechanism	Discuss and negotiate among those who are in conflict. Unresolved matters may be decided in court.
6. Sanctions against forest encroachment	Forest encroachment on the areas by non-members is punished by a Rp 5 million (AUD 593) fine or spending six months in jail.
7. Benefit-sharing agreement	It is stated that products and services should be shared between FDA and community group. However, the proportion of sharing has not been decided.

Sources: Adapted from BRLKT (1995), FDA Sumbawa staff, pers. comm., (02/09/2003), FDA Sumbawa staff, pers. comm., (04/09/2005), FDA Sumbawa, WWF Indonesia Nusa Tenggara Programme and CIFOR (2005).

In return for the rights granted under *Perda PSDHBM*, the community agrees to several responsibilities: that they should not cut any timber that could lead to opening the canopy; avoiding farming practices that could lead to soil erosion and changes in soil structure; and ensuring other practices do not have potentially destructive impacts that could affect the ecological balance. The community should also implement rehabilitation as necessary in accordance with the existing regulations and should actively manage the areas allocated and not abandon them.

As the collaborative partner, the FDA had major responsibilities under the *Perda PSDHBM* scheme, mainly in representing the local government (Head of District) as a member of the *FHM* (*Forum Hutan Masyarakat* or Community Forest Forum) in processing the request, as well as throughout all stages of planning, implementation, and evaluation. In line with the national policy and regulations for community forestry management, the FDA has the obligation to ensure the implementation of the scheme follows the regulations imposed by the central government (i.e. MoF) (see Table 4-3).

Table 4-3. Regulations imposed nationally by MoF on the timber-based management related programme
Three main regulations are imposed nationally by MoF: 1. Land rent and land tax refer to the latest government regulation produced in *Peraturan Menteri Kehutanan* (Minister of Forestry Regulation) No: P. 64/Menhut-II/2009 (MoF, 2009h). Land rent refers specifically to *Iuran Izin Usaha Pemanfaatan Hutan pada Hutan Produksi (IUPHHK)* or fee for permit granted to utilise state production forest, while land tax refers to *PBB (Pajak Bumi Bangunan)* or tax for land and building thereon. 2. Timber harvesting and transport have to follow procedures set down in: a. *SKSHH-Surat Keterangan Sahnya Hasil Hutan* (Certificate of validity of forest products) as required following Ministry of Forestry regulation No. P. 55/Menhut-II/2006, in which timber harvesting requires a certificate of validity of forest products confirming the origin of the products b. *Provisi Sumber Daya Hutan-PSDH* (Forest resources provision) as imposed by Mo F's regulation P. 18/MENHUT-II/2007 for any timber extraction from state forests.
Sources: Adapted from MoF (2006a; 2007a; 2009h).

These regulations are imposed in relation to timber-based management, such as land rent and land tax, as well as those regulations that are part of the timber harvesting and transport procedures. Currently, there are no direct implications for community tree-growing in Sumbawa, since there are no timber harvesting and transport activities. However, there are some potential cost implications that will affect the commercial feasibility of the schemes, as discussed further in Section 4.4.

In relation to ex-Perhutani timber, MoF finally released the new regulations in 2009, pertaining to rights that can be provided to individuals or community groups to harvest a certain volume of standing stock, including from timber plantation resulting from *HTHR-Hutan Tanaman Hasil Reboisasi,* i.e. timber plantation resulting from the rehabilitation programme (MoF, 2009f). This new regulation refers to MoF Decree No. P. 46/Menhut-II/2009 on the procedure for harvesting timber and non-timber forest products in production forests (MoF, 2009f). Timber harvested can be used only for self-consumption and should not be used for marketed purposes at the maximum of 20 tons per household that can be cut in one year. These rights can be renewed (MoF, 2009f). However, before community members can apply for harvesting rights individually or collectively in these areas, the potential areas should have been approved by the MoF as designated *HTHR* areas that can be harvested (MoF, 2009e). This was outlined in the MoF Decree No. P. 13/Menhut-II/2009 on the timber plantations which resulted from the reforestation programme, which specifies that the local government has to identify the areas that potentially can be harvested and submit the proposal to MoF (MoF, 2009e). Before approval can be granted, long and complicated procedures have to be followed, such as the inventory processes complemented by detailed maps of the location and standing trees (MoF, 2009e). Unfortunately, these procedures have made the opportunity to harvest standing timber stocks unrealistic for local people, who have committed to maintaining and supervising the *HTHR* areas.

4.2.2.2. MoF initiative: National Social Forestry (NSF) Programme

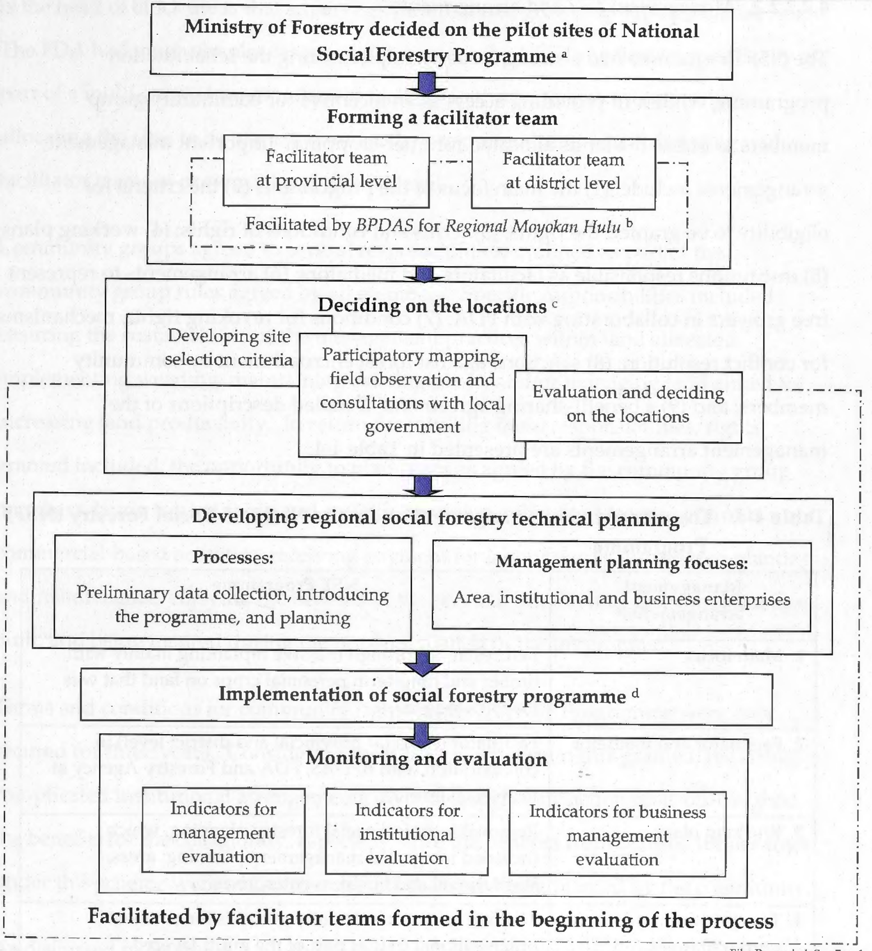
This section focuses on two main points: institutional arrangements; and management foci and arrangements.

4.2.2.2.1. Institutional and management arrangements

As defined by the MoF, there are at least six main steps required to grant the rights for a community tree-growing scheme (Figure 4-4). In the beginning MoF decided the locations for pilot sites for the NSF Programme. Particularly for Sumbawa, MoF decided that the location was to be on ex-Perhutani areas as part of the rehabilitation programme for illegally logged and encroached forest areas. After the locations were decided, facilitated by *BPDAS-Balai Pengelolaan Daerah Aliran Sungai* (the provincial-based watershed management centre), facilitator teams were formed at provincial and district levels. Members of the facilitator teams included the PDA and FDA. The facilitator teams acted throughout all the next processes of deciding the locations, developing the regional technical planning, and the implementation, as well as monitoring and evaluation.

In deciding the locations for implementation, the facilitator teams had to develop the site selection criteria, facilitating the participatory mapping as well as field observations and consultations with different stakeholders, before then deciding the specific location at village level. In Sumbawa, it was decided the programme would be implemented in three villages, including Lamenta. The facilitator teams had also to facilitate the development of the regional social forestry technical planning. There were two important components of these activities, which included in the development of the management planning that should cover the area, institutional and business enterprises development. Each development process should include preliminary data collection, introducing the programme, and consultations with different stakeholders. These three planning components of the area, institutional and business enterprise development also defined the development of the indicators as part of the monitoring and evaluation processes.

Overall, it was observed that the processes were quite lengthy and complicated (about one to two years), and this outweighed the benefits from the rights that were only granted for three years. Moreover, there was no opportunity to renew these rights, since the national-level MoF decree on Social Forestry was replaced by the latest decree on community forestry, MoF Decree No. P. 37/Menhut-II/2007 (MoF, 2007b).



Notes:

a. In Sumbawa, it was decided to rehabilitate ex-Perhutani areas through replanting.

b. BPDAS-*Balai Pengelolaan Daerah Aliran Sungai* (The watershed management centre).

c. Included developing eligibility criteria for community members to be allocated lands under NSFP programme.

d. The management was based on an equal plot of management areas distributed equally to all community groups involved in the village forum, and the implementing national budget was secured for only three years (2003–2005).

Sources: Adapted from PKSK & BRLKT (2004), MoF (2004b).

Figure 4-4. Processes required to implement NSFP (National Social Forestry Programme)

4.2.2.2.2. *Management foci and arrangements*

The NSF Programme had a strong focus on implementing the rehabilitation programme, while still providing access as an incentive for community group members to utilise the lands allocated for inter-cropping. Important management arrangements include: (1) the main focus of the programme; (2) the criteria for eligibility to be granted the rights; (3) terms and conditions of rights; (4) working plans; (5) institutions responsible as facilitators and mediators; (6) arrangements to represent tree growers in collaborating with FDA; (7) conditions for revoking rights, mechanisms for conflict resolution; (8) sanctions against forest encroachment by community members; and (9) a benefit-sharing agreement. Detailed descriptions of the management arrangements are presented in Table 4-4.

Table 4-4. The management arrangement under the National Social Forestry (NSF) Programme

Management arrangements	NSF Programme
1. Main focus	Reforestation through massive replanting mainly with timber and long-term perennial crops on land that was illegally-logged.
2. Facilitator and mediator	Facilitator teams (at provincial and district level) in collaboration with *BPDAS*, FDA and Forestry Agency at Provincial level.
3. Working plans	Regional technical social forestry planning, which included integrated management planning: areas, institutional and business enterprises.
4. Tree grower representatives	The tree grower community group is the smallest organisational unit as part of the multi-layered organisation system of sub-district, village, sub-villages and block of areas managed by different tree grower community groups.
5. Conflict resolution mechanism	Discuss and negotiate through the organisational system in place.
6. Sanctions against forest encroachment	No sanctions were clearly defined.
7. Benefit-sharing agreement	Based on dividend.

Sources: Adapted from PKSK & BRLKT (2004), MoF (2004b).

The tree grower representative is part of a multi-layered organisational setting at sub-district, village, and sub-village levels. Under the sub-village organisational unit, there is the head of block areas that supervises different tree grower groups (*Kelompok Tani*). The FDA had much simpler responsibilities under the NSF Programme, specifically as part of a multi-layered organisation in facilitating the participatory mapping, in allocating the sites to be managed under the programme, and in collaborating with facilitator teams at provincial and district level.

Community groups agreed to several responsibilities, outlined as part of the community group rules agreed by all members. Specific responsibilities included ensuring the sustainability of the management practices within land allocated, implementing weeding, maintaining existing plants and/or managing land aimed for increasing land productivity. In return for fulfilling these responsibilities, rights granted included: the opportunity to plan crops as agreed by the community group members, being treated fairly and equally, receiving a dividend from any profits from commercial-based activities, receiving payment for labour works during tree-planting and maintenance, enjoying the benefits of the services provided by any infrastructure built, and being insured during the implementation of the programme.

Terms and conditions for community rights under the NSF Programme were only secured for three years. Considering these very short-term rights granted, requiring complicated institutional arrangements involving high transaction costs outweighed the benefits for the community, especially since the benefits from planted timber trees under this scheme were not secure, despite the trees being planted by the community.

As discussed in Section 4.2.1.1, the current policy on community forestry allows a community to harvest the trees that they planted. However, when the NSF project ended in 2005 after three years' implementation, tree growers no longer had secure rights to their trees. Currently, these pilot areas under the NSF Programme have been under review as to what extent the land managed under this programme can be included as part of the proposal to be granted rights under community forestry scheme (WWF Indonesia NT Programme, email communication, 03/11/2010). However, despite this pending recognition from MoF, the community group has secured rights to use the land inside state forests for inter-cropping as discussed in Section 4.4.

4.3. Community tree-growing schemes under the state-nested system in Bima

As in the other four districts in WNT Province, the local government in Bima District has experienced three primary problems in forestry management. These problems are: the high demand for farming land inside state forests, high numbers of cases of conflict over forest resources among different stakeholders, and forest resources under pressure to contribute to *PAD-Pendapatan Asli Daerah* (local government revenues) (Suryadi, 2003; Supardi *et al.*, 2006; Achyar HMA *et al.*, 2006).

These problems have not been effectively resolved by the local government, since the lack of a regulatory framework at district level was the main impediment to accelerating progress on community-based forestry management (CBFM) in Bima. The reforestation programme, mainly through tree-planting projects, had been the main priority in initiating and developing the community forestry programme, including the community tree-growing scheme.

In this situation, with no clear overarching policy framework, there were several community initiatives based on local rules that worked and were recognised by national and international communities. For example, *Awig-awig*[10] was implemented in one of the case study villages, Ntori. The local community initiatives were initiated in response to the competitive use of the forest resources and the necessity to address conflicts that had resulted from the situation. This locally based initiative is compared to the government-based project implemented in Nggelu Village. However, before discussing the two cases in detail, it is important to understand the historical contexts that have affected the current conditions.

4.3.1. Overarching policy framework, institutional and management arrangements, and the dynamics of the tenurial conditions

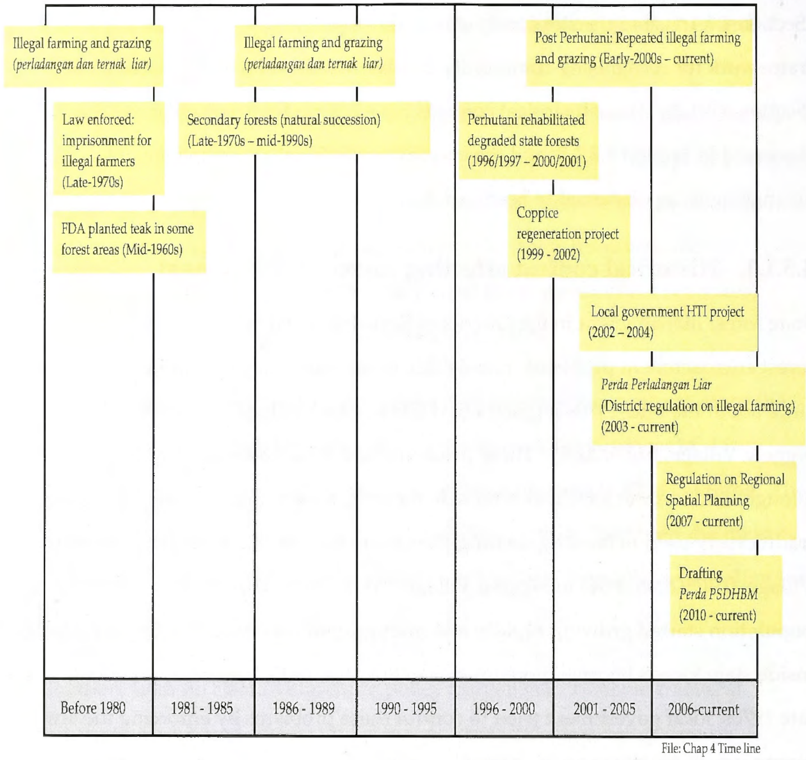
Two relevant historical contexts that affected the current management are discussed in this section: first, the different government initiatives at district, provincial and national levels in responding to the repeated problems of illegal farming and grazing

[10] *Awig-awig* refers to traditional rules on local land management created, agreed and respected by all members (see Box 4-3 for detailed example).

(Section 4.3.1.1); and the slow and belated development of the overarching policy framework for recognising community involvement in state forest management (Section 4.3.1.2). These historical contexts have affected the tenurial conditions as discussed in Section 4.3.1.3, and the current institutional and management arrangements as discussed in Section 4.3.2.

4.3.1.1. Historical context affecting current management

State forest management in the District of Bima had been facing serious and repeated forest encroachment problems, mainly due to intensive illegal farming and grazing, since about the mid-1970s (Figure 4-5) (FGD in Ntori Village, 03/03/2005; FGD in Nggelu Village, 04/03/2005). These problems had arisen mainly because there was not enough land to meet local needs outside the state forests, and because local people traditionally used to farm by clearing the forests for farming lands (FGD in Ntori Village, 03/03/2005; FGD in Nggelu Village, 04/03/2005). However, when the population started growing rapidly and immigration increased, the illegal farming inside state forests became more intensive (Suryadi, 2003; Supardi *et al.*, 2006). In the late 1970s, local government tried to control these problems by enforcing the law, giving prison sentences to trespassers in state forests, which scared people away from the state forests. This was effective for about five to ten years, enough time to allow the natural succession to occur in some parts of the forests. Secondary forests were formed, before the repeated illegal farming occurred again in the mid-1990s.



Sources: FGD in Nggelu Village (04/03/2005) and FGD in Ntori Village (03/03/2005).

Figure 4-5. Timeline of historical changes affecting the current community tree-growing scheme in Bima

In line with the national programme set out by MoF, Perhutani also rehabilitated degraded state forests in Bima District, but only for a short time from 1996/1997 to 2000/2001 (MoF, 2009a). Compared to Sumbawa, the programme was implemented in smaller coverage areas of 4,184 ha including 500 ha in Nggelu (MoF, 2009a). However, Perhutani implemented reforestation based on the *HKm* scheme (MoF, Undated). Under this scheme the proportion of timber and non-timber crops inside state forests should be in the ratio of 70% timber to 30% non-timber crops, instead of 100% timber as under the HTI scheme.

After Perhutani had left, Bima District faced the more serious and repeated problems of illegal farming and grazing. There were several important initiatives explored by government (i.e. at provincial level), as well as by several community groups, as part of the efforts to manage the problems. For example, driven by the poor condition of the abandoned state plantation areas in Ntori, the community group called *Dana Kala* had the initiative to apply for rights to manage the areas for food crop farming (Achyar HMA *et al.*, 2006). The community group submitted the proposal directly to the Provincial Forestry Agency (PFA) and rights were granted for three years under the Coppice Regeneration Project implemented under *HKm swadaya* (self-funded community forestry scheme) from 1999 to 2002 (Achyar HMA, 2005b). In 2002, PFA also initiated the programme called *HTI swakelola* (self-managed *HTI*) in Nggelu, which aimed to rehabilitate some of the degraded ex-Perhutani areas. *HTI swakelola* was a programme developed based on a government budget, in this case provincial government (Achyar HMA, 2005b). However, the district government had also initiated the *Perda Perladangan Liar* or district regulation on illegal farming, which declared all activities being conducted inside state forests illegal (Achyar HMA, 2005b). Section 4.3.1.3 presents a discussion on the institutional and management arrangements for both initiatives, and shows how the district regulation on illegal farming impacted these initiatives.

4.3.1.2. The development of an overarching policy framework for community involvement in tree-growing

The two important development processes of the overarching policy framework in Bima centred on the *RTRW-Rencana Tata Ruang Wilayah* (Regional Spatial Planning) regulation and the belated drafting of the *Perda PSDHBM*, which was long overdue, considering the seriousness of the forest encroachment problems in Bima District. The development of the *Perda PSDHBM* was justified, since the concept for community empowerment strategy was not clear. Because of this lack of clarity, it has been very difficult for other stakeholders to provide support for the development and the implementation of the community-based forest management including the community tree-growing scheme (*Pemda Bima* and WWF Indonesia NT Programme, 2010). These stakeholders, such as development agencies, are interested in facilitating the adoption of the community-based forest management under a participatory approach.

As analysis of the *RTRW* document shows, the regional spatial planning covers integrated aspects of the social, economic and ecological carrying capacity of the natural resources with consideration of the potential development aspects and their characteristics (Pemda Bima, 2007). The district-level *RTRW* is a translation from the *RTRW* developed at provincial level; therefore, maintaining consistency is important for developing the *RTRW* at district level (Pemda Bima, 2007; Dishut Provinsi NTB, 2009). However, there is still not sufficient focus on forest management, since in the document, spatial planning for forest areas is combined with the overall development of estate crops. Timber management for commercial purposes focuses mainly on logging-based activities in natural forests. In relation to timber plantations, the productive use of forest lands focuses mainly on afforestation and rehabilitation. Further, there is no clear strategy for how commercial plantations can be developed in the district of Bima, nor on how the community can participate in the management of timber plantations or in developing a community tree-growing scheme.

The development of *RTRW* has provided a good basis for drafting the *Perda PSDHBM*, which is very important for setting out a more integrated community forestry development strategy that works in the long-term. It is declared in the draft document that the *Perda PSDHBM* aims to serve as the basis for developing community forestry programmes that have a strong basic law and policy framework, by ensuring more integrated support from those who are involved in forestry and other related sectors (Box 4-2). The document also finds the need to integrate initiatives from other parties. The *Perda PSDHBM* also recognises different strategies for implementing a community forestry programme that recognises various forms and practices, possibly based on local practices.

Box 4-2. Important points arising from the draft of the *Perda PSDHBM* in Bima

1. Aims of the *Perda PSDHBM*

a. Providing the basic law for the implementation of a community forestry programme
b. Creating the policy and forest resources management system that is in line with principles of community forestry
c. Enhancing the support from all government officers in the forestry sector and other related sectors related to the implementation of community forestry
d. Effective information and networking communication in community forestry development
e. Creating an institutional framework at the local government level that is robust and under which there is commitment to facilitating empowerment of the community as the main actor in community forestry
f. Accommodating the collaboration and assistance from other parties (nationally and internationally) for integrated development and promotion of community forestry

2. Strategy to develop community forestry

a. Extensively implementing the community forestry concept and policy, especially in ex-Perhutani areas
b. Developing a strong and effective foundation for developing national community forestry institutions that are recognised with clear authority
c. Developing different forms of implementing community forestry on various forest categories (e.g. production forests, protected forests) through collaborative projects with different parties
d. Intensifying the roles of the community forestry coordination forums at regional and national levels
e. Improving the diversity of services or products by ensuring the data availability, information, facilitation, technical assistance, and funding assistance to the local government
f. Enhancing effective promotion of community forestry covering different locations and parties at national and international level.

Source: *Pemda Bima* and WWF Indonesia NT Programme (2010).

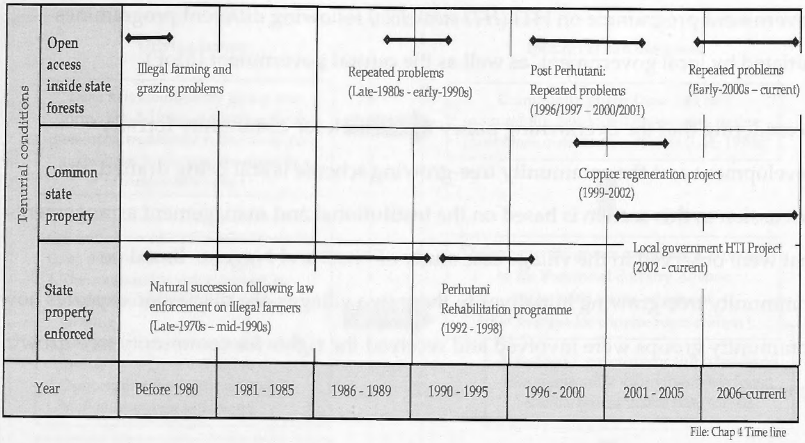
As discussed in Section 4.3.1.1, most of the community tree-growing related activities in this district were initiated either by the provincial government (i.e. the Coppice Regeneration Project and *HTI swakelola*), or by the central government (i.e. Perhutani Reforestation Programme). Due to the absence of an overarching policy framework at district level, programmes initiated by central (MoF) and provincial governments often conflicted with local district government initiatives, as discussed in Section 4.3.1.3.

It is also important to provide a basis for other stakeholders' involvement in facilitating the development and implementation of community-based forest management, including a community tree-growing scheme. Having a clear policy framework is also important to make it easier for local government to have more initiatives and programmes that are in line with provincial and/or central government programmes, and similarly for the central/provincial government to introduce programmes more in line with local initiatives. Also, it would be easier for development/research agencies' mission to assist the acceleration of development of programmes more tailored to fill the gaps as required at the local level.

However, the draft of the *Perda PSDHBM* should be even further refined to clarify the rights of the community over timber production. It would also be important to clarify the link between the strategies for implementing community forestry, so that any new initiatives in this regard do not conflict. In relation to ex-Perhutani areas as also mentioned in the *Perda PSDHBM*, it is important to clarify the extent to which the community can be involved in community tree-growing development and securing rights over timber that was planted by Perhutani in collaboration with the local community. Therefore, a clear benefit-sharing agreement should be included. A strategy to link community timber products and services with the market is another point that should be included in the next version of *Perda PSDHBM*.

4.3.1.3. The dynamics of the tenurial conditions

The overwhelming body of evidence, such as from observation during the FGD in Nggelu Village (04/03/2005) and FGD in Ntori Village (03/03/2005), suggests that recognition of the promising roles communities could play in managing the state forests seemed to be developed as the last option. This was after more than thirty years of ineffective government-based law enforcement, such as imprisonment for those conducting illegal farming and grazing. Tenurial conditions have been open access for a long time, despite the status as state forests, especially during the time when the problems of illegal farming and grazing (forest encroachment) occurred (Figure 4-6).



Sources: FGD in Nggelu Village (04/03/2005) and FGD in Ntori Village (03/03/2005).

Figure 4-6. Tenurial conditions associated with different stages of forest policy and management

State tenure rights were able to be enforced temporarily under the law on imprisonment, and during the period when Perhutani was managing the land for the rehabilitation programme. Although the impacts of enforcing tenure rights on state forests had been limited, tenurial conditions involving the community under collaborative arrangements had improved. For example, despite rights granted being limited to three years under the coppice regeneration project, to some extent the community groups involved in the project gained a degree of respect from other community members inside and outside the villages. This is crucial to maintain the exclusiveness of the property rights, regardless of the lack of formal recognition. Further, the impacts of enforcing tenure rights on state forests can go beyond the project period.

4.3.2. Two main programmes of the community tree-growing scheme in Bima

Community tree-growing initiatives in Ntori and Nggelu were initiated in the past by the provincial and central governments. The Coppice Regeneration Project in Ntori was in fact responding to a community initiative that had proactively managed the abandoned state plantations and had requested inter-cropping rights. On the other hand, the community tree-growing scheme in Nggelu was part of a provincial government programme on HTI (*HTI swakelola)* following different programmes initiated by local government, as well as the central government (MoF).

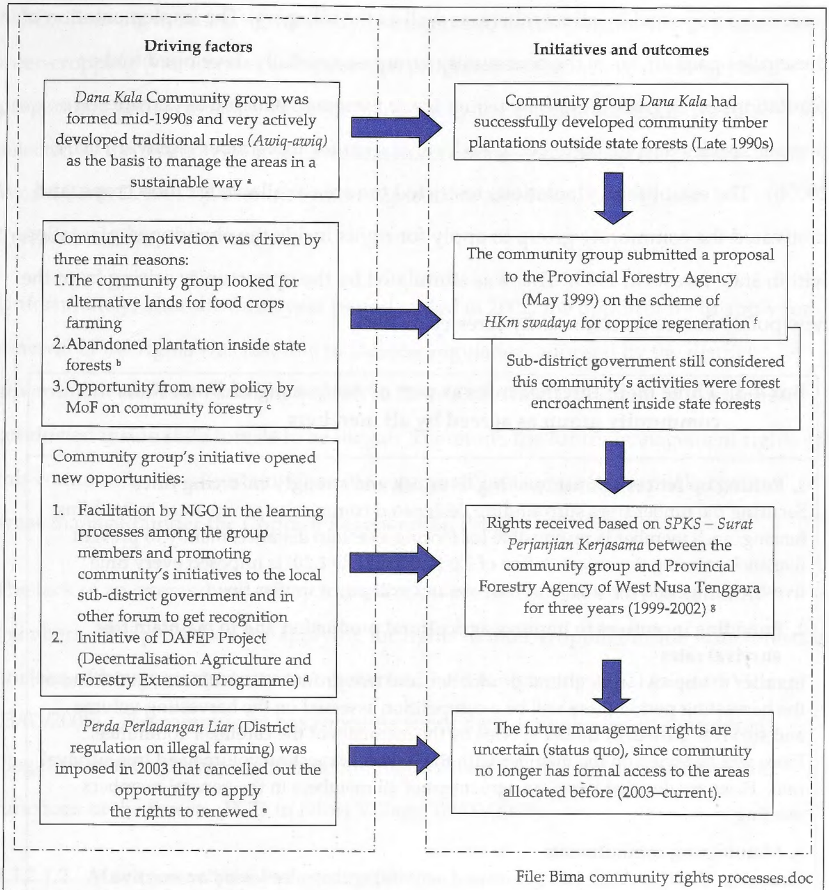
Considering that the overarching policy framework for community forestry development and the community tree-growing scheme is still being drafted, the discussion in this section is based on the institutional and management arrangements that were observed in the village case study of Ntori and Nggelu. Based on community tree-growing initiatives in these two villages, the discussion explores how community groups were involved and received the rights for community tree-growing schemes.

4.3.2.1. Provincial government initiative: Coppice regeneration project

Discussion in this section focuses on two main points: the institutional arrangements, and the management foci and arrangements.

4.3.2.1.1. Institutional and management arrangements

In Ntori, *Dana Kala* community group was formed in the mid-1990s and very actively developed traditional rules (*Awig-awig)*, successfully leading the community group to develop timber plantations on their privately owned lands (Figure 4-7). The traditional rules are directed to manage the main disturbance to the community's crops, particularly from livestock belonging to villagers that roam unattended around farming areas. This traditional practice of looking after livestock is quite common in West and East Nusa Tenggara and often stimulates conflicts among villagers (Achyar HMA, 2005b; Supardi *et al.*, 2006).



Notes:

a. Awig-*awig* refers to traditional rules created, agreed and respected by all members (See Box 4-3).
b. Plantations were initiated based on three-year contracts between FDA and community in the 1980s.
c. Refers to MoF Decree imposed in 1995 (see Section 4.2.1).
d. Joint initiative between the Ministry of Agriculture (MoA), the MoF, and the World Bank (WB).
e. According to this Perda, any activities inside state forests are illegal.
f. Community group had started to clear and prepare the area before rights were granted.
g. SPKS was the agreement on the collaborative arrangement between FDA and the community group.

Sources: Adapted from: FGD in Ntori Village (03/03/2005; 13/06/2005); Ahyar HMA (2005b).

Figure 4-7. Processes for community group in Ntori Village to obtain the rights in the absence of district regulation

Putting up fences and applying fines are strongly enforced by the community group, as well as providing incentives to improve agricultural production and to maintain tree survival rates (Box 4-3). These internal rules were set down by all community group members and developed based on common local problems; therefore, these were rules respected by all members, as well as the villagers. The implementation of these rules paid off, since the community group successfully developed timber plantations on degraded areas by using *Acacia mangium*, which was considered a pioneer species despite there being no local market for this timber (Achyar HMA, 2005b). The established plantations restricted the area available for food crops, and motivated the community group to apply for rights inside the abandoned plantation within state forests in 1999. This was stimulated by the opportunity arising from the new policy decree on community forestry in 1995.

Box 4-3. Three main internal rules as part of *Awig-awig* of *Dana Kala* community group as agreed by all members

1. Putting up fences against roaming livestock and strongly enforcing fines
Securing the timber trees surrounding designated community group areas by building fencing; each member is responsible for fencing a certain distance, mainly to prevent livestock entering the areas. A fine of Rp 10,000 (AUD 1.20) is imposed every time livestock enter and the owner of the livestock will pay a similar fine.

2. Providing incentives to improve agricultural production and to maintain tree survival rates
In order to improve agricultural production and tree growth survival rates, at the end of the harvesting period there will be a competition assessed on the harvesting volume and survival growth of timber species by the members of the caretaker committee. Fines will be levied on the member with the lowest harvesting volume and tree survival rate. Fines are decided based on agreement of all members in the general members meeting.

3. Maintaining commitments
Fines (Rp 15,000 or AUD 1.80 per missed activity) will also be levied on inactive members for not participating in community group activity/programme. After three absences, membership can be revoked and the person dismissed from community groups.

Source: FGD in Ntori Village (03/03/2005).

File: Supporting evidences Sumbawa and Bima.doc

The community group submitted the proposal directly to the PFA, since the sub-district government had never approved their initiative to work inside state forests and considered their activities to be forest encroachment. While waiting for a decision on the proposal, the community group continued to clear and prepare the areas, while maintaining the coppice from existing cut-off teak trees.

The rights were finally granted by the provincial government in 1999, but this was only for three years. The successful community efforts in gaining the rights had opened up significant new opportunities for receiving training and learning facilitated by a local

NGO. Training included agroforestry management, developing medicinal plants for inter-cropping (*Wanafarma),* and extension programmes for raising seedlings, land preparation and fertilising. The area managed by the community group was also selected as the location for implementing internationally funded projects, such as the World Bank DAFED (Decentralisation Agriculture and Forestry Extension Programme) Project for one year.

Unfortunately, after the three-year period ended in 2002, the opportunity to apply for renewal of the rights was lost due to the new regulation imposed by the district government on *Perda Perladangan Liar* No 25 in 2003, which considers any activities conducted inside state forests to be illegal. Therefore, the future management rights of this community are uncertain, since the community no longer has formal access to areas managed under the Coppice Regeneration Project.

The lack of an overarching policy framework was also recognised by community members. The procedure for applying for rights to inter-cropping inside state forests is unclear, although community members need land for farming (FGD in Ntori Village, 03/03/2005). The community has concerns about their activities being considered illegal, even though they contributed to maintaining the ecological conditions and functions of the forests (FGD in Ntori Village, 03/03/2005).

4.3.2.1.2. Management foci and arrangements

The Coppice Regeneration Project focussed on providing limited rights to the community group, which was capable of utilising the lands for inter-cropping and maintaining the coppice of logged teak trees as a way to regenerate the teak plantations. Other villages had successfully developed teak plantations using this technique and received a national award for their successful rehabilitation programme on privately owned lands. This was the case for the community of Nata Village (FGD in Nata Village, 05/03/2005). In the two case studies, a 2005 survey revealed that tree growers were motivated mainly to participate in programmes initiated by the local government because of the prospect of formal access (about 57%). Other motivations were because they were interested to join collaborative management arrangements (29%), and because they already had land inside state forests (14%) (CIFOR and WWF Indonesia survey data, 2005).

The management arrangement was based on *SPKS-Surat Perjanjian Kerjasama* (the agreement for cooperation) between the community and the district government representing the higher level of the government agencies at the provincial and central level. However, it was very difficult to obtain a copy of this document (FGD in Ntori Village, 03/03/2005). In practice, the management arrangements were mainly based on informal and verbal arrangements, such as the processes of defining working plans and mechanisms for resolving conflicts (Table 4-5).

There had been no clear roles and responsibilities for the FDA in implementing the scheme outlined under this project. On the other hand, the community's main responsibilities were for maintaining and supervising the land and main timber crops from encroachment by non-participants, while the community members have the rights to utilise the land for inter-cropping. Crops for inter-cropping are particularly those that can improve the land productivity and are beneficial to community (FGD in Nggelu Village, 04/03/2005). These responsibilities took advantage of community groups' experiences in managing timber plantations on their privately owned lands outside state forests (Achyar HMA, 2005b).

Table 4-5. Comparison of the management arrangements under the Coppice Regeneration Project

Management arrangements	Coppice Regeneration Project in Ntori [a]
1. Main focus	Providing limited rights to community group, who were able to utilise the lands for inter-cropping and maintain the coppice of logged teak trees as a way to regenerate the teak plantations [b]
2. Facilitator and mediator	No specific institution was designed to have this role. Successful rights granted attracted NGOs to facilitate the learning processes and other projects to be implemented in this village
3. Working plans	Informal and verbal agreement of working plans as agreed by all community group members. A wide range of training was organised by different organisations (NGOs and government agencies at provincial/district levels)
4. Tree-grower representatives	The community group *Dana Kala* initiated by the community members themselves [c]
5. Conflict resolution mechanism	Discussed and resolved internally among the members of community group. The head and other caretakers of the group facilitated the discussions
6. Sanctions for forest encroachment	As included in the local rules, *Awiq-awiq,* this was mainly in relation to violation of the rule of not letting livestock enter the collective areas. Despite the rules being made for internal application, the villagers and outsiders respected these rules
7. Benefit-sharing agreement	Not defined

Notes:

a. Initiated by provincial government.

b. Tree regeneration using the coppicing technique is quite common in Bima District, since seedlings were considered expensive and difficult to find.

Sources: Adapted from FGD in Nggelu Village (04/03/2005; 14/06/2005) and Ahyar HMA (2005b).

The community members involved had high expectations that their efforts in maintaining and supervising the state forests would somehow be rewarded (FGD in Ntori Village, 03/03/2005; FDA Sumbawa, WWF Indonesia Nusa Tenggara Programme and CIFOR, 2005). For example, the community group in Ntori had actively managed the existing coppices by fencing, maintaining and pruning them as part of their efforts to implement techniques gained during training. However, the community rights over timber trees that were managed through maintaining their coppices were unclear, since there was no explicit agreement on benefit-sharing arrangements.

4.3.2.2. Provincial government initiative: *Hutan Tanaman Industri-HTI swakelola*

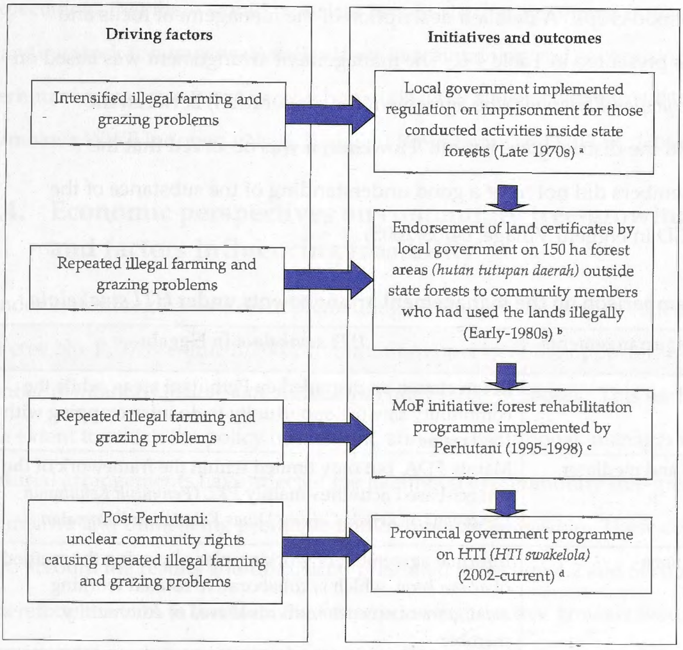
The discussion of the *HTI swakelola* scheme explores the institutional and management foci and arrangements.

4.3.2.2.1. Institutional arrangements

The different programmes implemented in Nggelu to address the pressures on state forests were implemented from the early 1980s to mid-2000s, but were not integrated. Similar problems of the forest encroachment arose to those described above, particularly due to the absence of a policy framework at district level. Initially, in the late 1970s, local government imposed a regulation calling for imprisonment of those conducting activities inside state forests (Figure 4-8). Due to strong pressure from community members for the right to farm inside state forests in the early 1980s, the local government endorsed land certificates for 150 ha of forest areas outside state forests (*hutan tutupan daerah).* These certificates were provided to about 189 households who were already using the lands with no formal rights. Obviously, this programme had sent the wrong message to other community members that it was possible to convert forest tenure to become individual, privately owned land.

After Perhutani left, the problems of illegal farming and grazing recurred, resulting in deforestation of 300 ha. The provincial government (PFA) decided to implement programme *HTI swakelola* on these areas in 2002 as part of its reforestation effort. Therefore, the activities were paid for from the provincial government budget and implemented by the FDA at district level together with the community. However, community involvement was mainly as paid labourers and not based on collaborative arrangements. Project-based maintenance activities were implemented twice, but no clear arrangements were specified for a continuing programme, even though the programme is still formally ongoing. Despite the absence of an arrangement that would mutually benefit both government and community, the initiative involving the community has had a positive impact, as it has prevented further serious forest encroachment on the ex-Perhutani areas because of the community's group efforts in maintaining and supervising the areas (FGD in Nggelu Village, 04/03/2005; 14/06/2005;

Achyar HMA, 2005b). This was mainly because the community was granted rights to do inter-cropping.



File: Bima community rights processes.doc

Notes:

a. The regulation was effective temporarily during the late 1970s up to mid-1980s before the problems reoccurred.

b. The certificates were distributed to about 189 households.

c. As part of the Perhutani assignment from MoF (See Box 4-1 for more detailed information).

d. The development of plantations was on Perhutani areas with no more standing stock due to forest encroachment (about 300 ha from total initial areas of 500 ha).

Sources: Adapted from: FGD in Nggelu Village (04/03/2005; 14/06/2005) and Ahyar HMA (2005b).

Figure 4-8. Various rights granted to community groups in responding to repeated problems of illegal farming and grazing in Nggelu

4.3.2.2.2. *Management foci and arrangements*

The *HTI swakelola* project focussed mainly on reforestation of degraded ex-Perhutani areas, and at the same time provided the opportunity for the community to do inter-cropping with food crops. A detailed description of the management focus and arrangement is presented in Table 4-6. The management arrangement was based on *SPKS-Surat Perjanjian Kerjasama* (the agreement for cooperation) between the community and the district government. However, it was observed that the community members did not have a good understanding of the substance of the agreement (FGD in Nggelu Village, 04/03/2005).

Table 4-6. Comparison on the management arrangements under *HTI swakelola*

Management arrangements	*HTI swakelola* in Nggelu
1. Main focus	Reforestation on degraded ex-Perhutani areas, while the community saw the opportunity to do inter-cropping with food crops
2. Facilitator and mediator	Mainly FDA, but only limited within the framework of the project-based activities-mainly *PKL (Penyuluh Kehutanan Lapangan)* or *Kepala Cabang Dinas Kehutanan Kecamatan*
3. Working plans	Informal agreement of working plans by using the method of *arisan kerja*, which is collaborative rotated working arrangement on each individual area of community member
4. Tree-grower representatives	No community group was formed as part of the programme initiated by FDA. Community group gathers informally as required
5. Conflict resolution mechanism	Discussed and resolved internally among the community members. Unresolved cases were forwarded to *PKL-Penyuluh Kehutanan Lapangan* (Forestry extension officer or *Kepala Cabang Dinas Kehutanan Kecamatan* (Head of the sub-district forestry office)
6. Sanctions for forest encroachment	Not clearly defined
7. Benefit-sharing agreement	Not defined

Note: a. Initiated by provincial government.
Sources: Adapted from FGD in Nggelu Village (04/03/2005; 14/06/2005) and Ahyar HMA (2005b).

The problems of the forest encroachment through practices of illegal farming and grazing arose mainly because no clear sanctions were outlined, recognised and respected by villagers. Primarily, the absence of the agreed rules on sanctions was due to no community group existing, notwithstanding that this was a provincial government-based initiative (Achyar HMA, 2005b).

The lack of coordination between provincial and district governments contributed to the lack of initiative from district government in facilitating the formation of a community group. However, the community members involved had high expectations that there would be a clear benefit-sharing agreement from existing standing stock to compensate their efforts in maintaining and supervising the ex-Perhutani areas from forest encroachment (FGD in Nggelu Village, 04/03/2005; FDA Sumbawa, WWF Indonesia Nusa Tenggara Programme and CIFOR, 2005).

4.4. Economic perspectives on community tree-growing schemes, and factors influencing feasibility

Under current regulations on implementing community forestry as stated in MoF Decree No. P. 37/Menhut-II/2007, communities now have the opportunity to manage timber plantations inside state forests for commercial purposes. This section assesses the extent to which the policy framework, and the institutional, management, and tenurial arrangements have affected the likelihood of community tree-growing in Sumbawa and Bima being profitable and commercially feasible. These conditions take into account the results and discussion presented in Section 4.2 and Section 4.3. Therefore, the CBA is based on the assumption that the tree growers would eventually have the right to harvest the timber under a benefit-sharing agreement with FDA.

Based on Cost Benefit Analysis (CBA) as discussed in Section 3.3.3 of Chapter 3, the results in this section are organised into two main sections. First, the financial feasibility and profitability of the community tree-growing schemes in Sumbawa and Bima are compared (Section 4.4.1). A discussion on the dependency of the community on third parties in developing timber plantations follows (Section 4.4.2), and potential impacts on local livelihoods are discussed (Section 4.4.3). The last section discusses the financial benefits from the community tree-growing scheme in comparison with other land-based investment alternatives already practised by the local community (Section 4.4.4).

4.4.1. Financial feasibility and profitability of community tree-growing schemes in Sumbawa and Bima

The financial feasibility and profitability under current practices is defined by how the land is owned; this comprises a combination of existing timber standing stock and intercropped crops as part of the community tree-growing scheme. On average, each community group member in Sumbawa managed about 2.50 ha of land, which was higher than the average in Bima, with an average of 1.62 ha, although the proportion of land managed inside state forests was slightly higher in Bima (46%) than in Sumbawa (42%) (Table 4-7). External pressures to use the land inside state forests were higher in Bima as reflected by smaller average land ownership outside state forests (less than one ha). Overall, the average total land owned by each household in Bima is also much lower than the average area of land managed per household at the district level.

Table 4-7. Land ownership characteristics among survey respondents in Sumbawa and Bima

Description [a]	Case studies		
	Sumbawa (n = 95)	Bima (n = 35)	Average
1. Total land managed per household (ha)	2.50	1.62	2.06
2. Land managed inside state forests per household			
a. Areas (ha)	1.05	0.74	0.89
b. Proportion to total household managed areas (%)	42%	46%	44%
3. Land ownership outside state forests (ha)			
a. Areas (ha)	1.45	0.88	1.17
b. Proportion to total household managed areas (%)	58%	54%	56%
4. Average of total land managed per household at district level (ha) [b]	2.08	3.80	2.94

File: Data analysis\Compilation\Compilation Sumbawa & Bima.xls - HH lands(

Sources:
a. Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara Programme (2002-2005).
b. BPS Sumbawa (2008) and BPS Bima (2010).

The existing standing stocks were initially planted by Perhutani, and then the central and provincial governments. Total standing stock managed by household in Sumbawa (1,061 trees) were much higher than in Bima (221 trees), due to a significant number of newly planted trees under the NSF Programme in Sumbawa in addition to the existing standing stock planted by Perhutani (Table 4-8).

The proportion of land allocated for timber and inter-cropping reflects the external pressures on state forests from the community requiring land for farming (discussed in Section 4.2 and Section 4.3). Pressures on state forests in Sumbawa were less intensive compared to those in Bima. Land used by tree grower respondents for inter-cropping was 15% of the total land available inside state forests, and the remainder was reserved for the existing standing timber stocks. In Bima, the area of land used for inter-cropping (58%) was slightly higher than for timber (42%), which indicates local people in Bima needed more land for inter-cropping than those in Sumbawa.

Table 4-8. Allocation of land uses and estimated standing stock for total cooperative and per household in Sumbawa and Bima [a]

1. Allocation of lands inside state forests for timber and intercropping

Description	Community tree growing schemes				Average	
	Sumbawa		Bima			
Types of land uses	Σ	%	Σ	%	Σ	%
a. Timber	238	85%	6	42%	122	64%
b. Intercropping	42	15%	8	58%	25	36%
Total	280	100%	14	100%	147	100%

2. Standing stocks managed by tree growers

Description	Community tree growing schemes		Average
	Sumbawa	Bima	
a. Total initial standing stocks	53,879 [a]	4,295 [b]	29,087
b. Per ha	632	528	580
c. Per household	1,061	221	641
d. Dominant tree species			
d1. Type of tree	Teak	Teak	Teak
d2. Σ trees per household	120	204	162

File: Compilation Sumbawa & Bima.xls - Land allocation

Notes:

a. Based on standard standing stock of 1,100 trees/ha refer to system applied by Perhutani (Julmansyah *et al.*, 2005).

b. Based on the average of standard standing stock of 400 tree/ha in Coppice Regeneration Project and 1,650 trees/ha in *HTI swakelola* scheme.

Sources: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Following this land allocation pattern, the financial benefit analysis was driven by the revenue from timber and inter-cropping. Financial benefits in Sumbawa are driven mainly by the revenue component from timber following the land allocation pattern. As shown in Table 4-9, in the combined management in Sumbawa, timber revenues comprise 68.37% of total revenues, while in Bima they contribute only 35.76% and the remaining revenue comes from intercropped crops (64.20%). For Sumbawa, the significant contribution from inter-cropping crops filled some of the gaps in revenue coming from timber, as the analysis of timber management resulted in negative financial benefits, even for the base case (Table 4-10). However, the higher allocation of land to inter-cropping inside state forests was inconsistent with what the government outlined in the latest MoF decree on implementing community forestry, that it should be a ratio of 70% of timber to 30% of inter-cropping (MoF, 2007b).

Table 4-9. Proportion of each revenue component from community tree-growing schemes in Sumbawa and Bima

Revenues component	Community tree growing schemes	
	Sumbawa	Bima
1. Timber (%) [a]	68.37%	63.64%
2. Intercropping crops (%) [b]	38.71%	36.29%
3. Salvage value of farming tools (%)	0.03%	0.06%
Total	100.00%	100.00%

File: Compilation/Compilation Sumbawa & Bima.xls - Revenues proportion (2)

Notes:
a. Types of timber in Sumbawa were teak, cassia, rosewood, and mahogany, and in Bima mainly teak.
b. Types of crops in Sumbawa were ginger, turmeric, paddy and mungbean, and in Bima candle nuts, cashew nuts, turmeric and ginger.
Sources: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Financial analyses on four cost scenarios were conducted for both timber and inter-cropping (Table 4-10) and timber only (Table 4-11). A discount rate of 8% was used for each (Sec 3.3.3). The four scenarios were: the base case that covers only timber plantations related costs (Scenario 1); the base case and adding the land rent and tax as the obligation of tree growers under *HTR* Programme following MoF (2009h)[11] (Scenario 2); the third one is by adding the transportation costs assuming tree growers

[11] As discussed in Section 1.1.2 (Chapter 1), *HTR* is the current MoF Programme to support the community's involvement in timber plantation development inside state forests (see Section 5.2.3 of Chapter 5 for further discussion on this programme).

will handle the transport to the nearest market point (Scenario 3); and the last one is Scenario 4 that includes all of the costs in Scenarios 2 and 3.

In the case of costs and returns from timber growing and inter-cropping (Table 4-10), positive NPVs were associated with all scenarios at Bima, but only the base case and Scenario 2 at Sumbawa. In the case of costs and returns from timber growing only (Table 4-11), positive NPVs were associated with all scenarios at Bima, but none at Sumbawa.

Taking into account the net benefit investment ratio (NBIR) that reflects the highest return per unit of investment, the highest return per unit of 10.16 is for the base case of timber and inter-cropping in Bima. Government money invested in Bima was cost-effective compared to similar expenses in Sumbawa. This confirms that the high-cost of government expenses in Sumbawa resulted in a lower ratio of returns per unit of investment (4). The IRR analysis confirms the nature of high-cost investment, yet profitable, in Sumbawa at 9% and 17% for Bima.

The results of the financial analysis on timber management only provides even greater losses of benefit values for Sumbawa in different scenarios, ranging from Rp 2,450 million or AUD 290,515 for the base case to Rp 3,304 million or AUD 391,869 for the management scenario including all of the costs (Table 4-11).

For Bima, the values of financial net timber benefits for different cost inclusion scenarios still indicated positive values, although at lower values compared to those from the combined timber and inter-cropping scenario. The highest return per unit of 7.02 is for the base case of timber and inter-cropping in Bima with the IRR at 22%. For the management scenario that takes into account all of the costs, the return per unit is lower at 5.51, with an IRR at 19%

Table 4-10. Financial net benefit from timber and inter-cropping under community tree-growing schemes in Sumbawa and Bima [a]

Timber & intercropping: financial analysis criteria at four cost inclusion scenarios	Community tree growing schemes	
	Sumbawa	Bima
1. Base case [b]		
NPV total (Rp million)	420	395
NPV total (AUD)	49,759	46,901
NPV per ha (Rp million)	4	25
NPV per ha (AUD)	452	2,950
IRR	9%	17%
NBIR	3.68	10.16
2. Include land rent and land tax [c]		
NPV total (Rp million)	393	394
NPV total (AUD)	46,583	46,747
NPV per ha (Rp million)	4	25
NPV per ha (AUD)	435	2,939
IRR	9%	9%
NBIR	0.90	0.36
3. Include transportation costs [d]		
NPV total (Rp million)	(408)	299
NPV total (AUD)	(48,420)	35,406
NPV per ha (Rp million)	(0.18)	19
NPV per ha (AUD)	(22)	2,257
IRR	8%	13%
NBIR	1.02	0.39
4. Include 2 and 3		
NPV total (Rp million)	(435)	297
NPV total (AUD)	(51,596)	35,253
NPV per ha (Rp million)	(0.28)	19
NPV per ha (AUD)	(33)	2,246
IRR	8%	21%
NBIR	1.02	0.40

File: Compilation Sumbawa & Bima.xls - NPV (5)

Notes:
( ): Negative value

a. Financial net benefit is estimated based on NPV (Net Present Value) following CBA using 8% discount rate (see Section 3.3.3 of Chapter 3 for methodological explanation and Appendix Table 4-3.29 to 4-3.32 for cash flow tables.
b. Base case refers to current condition with no costs from obligation to pay land rent/tax and no transporting timber costs have to be paid by tree growers.
c. Land rent/tax imposed on timber by the recent regulation on community-based forestry plantation program *(HTR-Hutan Tananam Rakyat)*.
d. Costs for transporting timber from farm gate to the nearest saw mills which commonly are borne by wood buyers.
e. Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Table 4-11. Financial net benefit from timber under community tree-growing schemes in Sumbawa and Bima [a]

Timber: financial analysis criteria at four cost inclusion scenarios	Community tree growing schemes	
	Sumbawa	Bima
1. Base case [b]		
NPV total (Rp million)	(2,450)	346
NPV total (AUD)	(290,515)	41,093
NPV per ha (Rp million)	(4)	15
NPV per ha (AUD)	(418)	1,725
IRR	7%	22%
NBIR	0.90	7.02
2. Include land rent and land tax [c]		
NPV total (Rp million)	(2,476)	345
NPV total (AUD)	(293,690)	40,939
NPV per ha (Rp million)	0.5	42
NPV per ha (AUD)	58	4,928
IRR	7%	10%
NBIR	0.90	7.01
3. Include transportation costs [d]		
NPV total (Rp million)	(3,277)	250
NPV total (AUD)	(388,694)	29,598
NPV per ha (Rp million)	(9)	24
NPV per ha (AUD)	(1,033)	2,901
IRR	6%	19%
NBIR	0.77	5.53
4. Include 2 and 3		
NPV total (Rp million)	(3,304)	248
NPV total (AUD)	(391,869)	29,444
NPV per ha (Rp million)	(9)	24
NPV per ha (AUD)	(1,056)	2,867
IRR	6%	19%
NBIR	0.76	5.51

File: Thesis\Data analysis\Compilation\Compilation Sumbawa & Bima.xls - NPV (5)

Notes:
( ): Negative value
a. Financial net benefit is estimated based on NPV (Net Present Value) following CBA using 8% discount rate (see Section 3.3.3 of Chapter 3).
b. Base case refers to current condition with no costs from obligation to pay land rent/tax and no transporting timber costs have to be paid by tree growers.
c. Land rent/tax imposed on timber by the recent regulation on community-based forestry plantation program (*HTR-Hutan Tananam Rakyat*).
d. Costs for transporting timber from farm gate to the nearest saw mills and commonly are borne by wood buyers.

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Linking back to the management characteristics discussed before (see Section 4.2.2 and 4.3.2), several factors determined the financial feasibility and profitability, including the level of involvement of central and provincial governments in initiating the schemes. The implementation of the community tree-growing scheme in Bima was concentrated in smaller scale management, since the schemes were mostly initiated and funded by provincial government as an immediate solution to resolve conflict over land due to forest encroachment. In contrast, the community tree-growing scheme initiated in Sumbawa covered larger areas and involved higher costs which were paid by the central government (MoF).

The results in Table 4-12 show that the absolute amounts and distribution of costs are different between the Sumbawa and Bima cases, for both inter-cropping and timber only. The proportion represented by government expenses is much greater (approximately twice) for Sumbawa, whereas the relative costs of managing crops and trees, and of transporting timber, are greater at Bima. Higher government expenses in Sumbawa reflected large-scale timber development costs made mainly by Perhutani for the schemes on *Perda PSDHBM* and the central government for NSF Programme. The relatively lower growing costs in Sumbawa are due to the lesser standing stock per ha. The more dominant role of inter-cropping in Bima is reflected in the relatively higher proportion of that cost (28%) than in Sumbawa (13%).

A comparison of the total cost per ha for timber confirmed the higher total production costs per ha in Sumbawa with the differences of Rp 77 million (AUD 6,903) (Table 4-12). One of the reasons for higher production costs per ha was because the current standing stock were only 55% and 37% of initial standing stock in Sumbawa and Bima, respectively. The average cost per ha for timber in Sumbawa (Rp 108 million or AUD 10,615) is about 10 times higher than the government standard cost per ha for developing the latest *HTR* Programme, which is Rp 10 million (AUD 1,288).[12]

---

[12] Based on MoF Decree No P. 64/Menhut-II/2009 on the costing standard for Industrial Timber Plantation (*HTI-Hutan Tanaman Industri)* and Community-based timber plantation (*HTR-Hutan Tanaman Rakyat)* (MoF 2009g).

Table 4-12. Cost components under timber and inter-cropping management in Sumbawa and Bima [a]

Cost components	Community tree growing schemes			
	Sumbawa		Bima	
	Timber and intercropping	Timber	Timber and intercropping	Timber
1. Government expenses [b]	59%	68%	27%	36%
2. Intercropping and timber expenses				
2.1. Farming tools [c]	0.8%	0.4%	3%	1.6%
2.2. Intercropping crops [d]	13%		25%	
2.3. Timber				
a. Labour on timber maintenance	6%	7%	8%	12%
b. Timber harvesting	8%	10%	13%	18%
c. Certifcate of validity of forest products [e]	1%	1%	5%	7%
d. Cooperative membership fees				
d1. Registration fees	0.01%	0.02%	-	-
d2. Annual fees	0.01%	0.01%	-	-
e. Forest resource provision [f]	4%	5%	4%	6%
f. Government-based land rent and tax	0.2%	0.2%	0.2%	0.3%
Total 2.3.	19%	23%	31%	43%
3. Transporting timber	8%	9%	14%	20%
Total costs (1 + 2 + 3)	100%	100%	100%	100%
Costs per ha (Rp million)	51	108	43	31
Costs per ha (AUD)	3,064	10,615	5,078	3,712

File: Compilation Sumbawa & Bima.xls - Cost proportion

Notes:

a. Estimation of present value following CBA using 8% discount rate. See Appendix 4-3 for detailed information in calculating each cost and for the cost values.
b. Expenses allocated by state-owned company and government at central, provincial and minor contribution from district government. See Appendix 4-3 for detailed government expenses (Point B2a).
c. Farming tools are jointly used by timber and inter-cropping crops.
d. For detailed costs for inter-cropping crops see Appendix 4-3 (Point C).
e. Refers to SKSHH-*Surat Keterangan Sahnya Hasil Hutan* (see Section 4.2.1.2).
f. Refers to PSDH-*Provisi Sumber Daya Hutan* (see Section 4.2.1.2).
g. The cost per ha was calculated based on the area existing with the remaining standing stock after illegal logging and/or forest encroachment.

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

As mentioned earlier in this section, the MoF initiated the *HTR* Programme to stimulate community-based timber plantations inside state forests. Specifically, the MoF has designed the credit scheme based on its estimation of *HTR* standard costs. Therefore, it is useful to do the sensitivity analysis on the community tree-growing scheme to analyse its comparability with *HTR* and identify any pitfalls in the *HTR* standard costs. If the standard costs for *HTR* are used, regardless of the current condition of existing standing timber stocks after illegal logging and forest encroachment, financial benefits for all scenarios in Sumbawa become all feasible (Table 4-13). Both options in Sumbawa, a combined timber and inter-cropping (Rp 21 million/ha or AUD 2,542), or the timber-based management only (Rp 41 million/ha or AUD 4,805/ha), generate net positive returns. For Bima, outcomes from both regimes are comparable, as the costs are three times higher than the standard costs under *HTR* programme (see also the discussion based on Table 4-12). However, the standard *HTR* cost might be underestimated, considering this was based on calculations for fast-growing species, such as *Acacia mangium,* for only one rotation of seven years with short-term oriented management practices (Nawir and ComForLink, 2007).

The analysis discussed in this section illustrates that there are three important management characteristics influencing the financial profitability and feasibility. The first is the proportion of allocated land managed for timber and inter-cropping, which was determined by the external pressures of limited land outside state forests that could be used for farming. This had resulted the increasing pressures to use land inside state forests for farming. However, current practices with a higher allocation of land to inter-cropping are not consistent with the decreed proportion of timber and non-timber crops inside state forests, according to the current MoF decree on *HKm*. It is regulated that the allocation should be 70% for timber and 30% for non-timber crops. Thus an adjustment to the regulations is required for some areas, considering the high external pressures to use land for inter-cropping. Second, community tree-growing schemes inside state forests depend heavily on the level of involvement of government in providing establishment costs and determining the scale of activities in relation to forest management. Government expenses contributed up to 68% of total costs for large-scale timber-based management and up to 36% for small-scale timber-based management. Third, timber-related costs, particularly for harvesting and transportation, represent the second highest proportion of costs, up to 38% of total costs. Currently, these costs are mainly borne by wood buyers/middle-men as discussed further in Section 4.4.2.

Table 4-13. Financial net benefit from community tree-growing schemes based on government standard *HTR* costs in Sumbawa and Bima [a]

Assessment criteria	Community tree growing schemes	
	Sumbawa	Bima
1. Timber and intercropping		
a. NPV value		
a.1. Rp (million)	4,668	875
a.2. AUD	553,628	103,825
b. NPV value per ha		
b.1. Rp (million)	21	66
b.2. AUD	2,542	7,818
2. Timber		
a. NPV value		
a.1. Rp (million)	1,799	203
a.2. AUD	213,355	24,108
b. NPV value per ha		
b.1. Rp (million)	41	28
b.2. AUD	4,805	3,337

File: Compilation Sumbawa & Bima.xls - HTR (2)

Note:

a. The cost per ha was calculated based on government standard *HTR* costs; the areas included the land rent/tax and transportation costs at the existing remaining standing stock. The *HTR* standard cost per ha is Rp 10,858,826 (AUD 1,288) (MoF, 2009h).

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Other scenarios for testing the financial feasibility in supporting commercial management of small-scale timber plantations are to analyse their sensitivity to external factors, inflation rates and wood prices. The main factors are inflation rates that affect the real discount rates (see results in Appendix 4-4.1 for Sumbawa and in Appendix 4-5.1 for Bima), and the round wood prices that are defined by the markets (specific results in Appendix 4-4.2 for Sumbawa and in 4-5.2 for Bima). From the analyses presented there, applying two levels of discount rate (4% and 12%)[13] confirms

[13] Based on the analysis of estimating real discount rates using three scenarios of inflation rates: the worst scenario during the economic crisis, the moderate scenario based on average economic conditions, and the best scenario based on the lowest inflation rate (see Section 3.3.3 of Chapter 3 for more discussion).

that applying a lower discount rate than used here, of 4%, leads to financially feasible management both in Sumbawa and Bima. Based on 12% discount rate, the management becomes unfeasible in Sumbawa even under the scenario of combined timber and inter-cropping, but is still feasible for the two scenarios of combined practices and timber only. When wood prices were assumed to increase, from 3% to 10% for all wood types, timber management scenarios in Sumbawa were still not financially feasible, in contrast to Bima.

4.4.2. The roles of third parties in developing timber plantations: distribution of costs borne by each stakeholder

Based on the analysis of community tree-growing schemes in Sumbawa and Bima, it is observed that government, community groups and wood buyers/middle-men have different roles in bearing the timber management costs. By understanding the nature of cost distribution among different parties, the arrangement for developing incentives for collaborative management under community growing schemes can be developed appropriately, based on a clear benefit-sharing agreement.

As shown in Table 4-12, the cost structure of tree-growing includes significant components of harvesting and transport costs (including forestry levies and taxes). The government plays a significant role in providing an initial establishment budget, as indicated from the nature of the community tree-growing schemes initiated in both Sumbawa and Bima (Sections 4.2 and 4.3). The proportion contributed by the government was 68% in Sumbawa and 36% in Bima.

Under the current practices, these costs are borne by wood buyers/middle-men (Table 4-14). This cost proportion ranges from 25% in Sumbawa to 51% in Bima, with an average of 38%. The role of wood buyers is quite significant in supporting community tree-growing operations, especially to fill the gap in the initial capital investment among tree grower community groups if they are going to market their timber. On the other hand, wood buyers often use this involvement as an excuse to suppress the price paid for timber.

Table 4-14. Costs borne in timber management with no inter-cropping by each stakeholder for existing standing stock in Sumbawa and Bima

Community tree growing schemes	Unit	Government [a]	Cooperatives [b]	Wood buyers at farm gate [c]	Total
Sumbawa	Rp million	7,575	789	2,076	10,440
	AUD	898,414	93,530	246,215	1,193,548
	Proportion	68%	8%	25%	100%
Bima	Rp million	100	51	249	401
	AUD	11,916	6,065	29,586	18,231
	Proportion	37%	13%	51%	100%
Average	Rp million	3,838	420	1,163	5,421
	AUD	455,165	49,798	137,900	605,889
	Proportion	52%	10%	38%	100%

File: Compilation Sumbawa & Bima.xls - Cost distribution

Notes:

a. Government costs involved investment initially made by Perhutani, and also subsequent investment allocated by the Forestry District Agency under National Social Forestry Program (NSF). See Appendix 4-3 for detailed components of government expenses (Point B2a).
b. Community groups bore the costs of farming tools, planting inter-cropping crops, labour on timber maintenance and supervision, community group membership fees, and government land rent and tax.
c. Wood buyers at the farm gate could include middle-men/brokers and local saw mill owners, who bore the costs for timber harvesting, acquiring certificate of validity of forest products (*SKSHH*), forest resource provision (*PSDH*), and transporting timber to the nearest wood processing point.

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Community groups contributed an average of 10% to the costs with no significant differences found between Sumbawa and Bima. Considering this contribution, a clear benefit-sharing mechanism between community groups and the FDA should be introduced at district level, mainly to create clear and direct incentives that would be more effective in stimulating tree-growing. As highlighted during FGD (Focus Group Discussion) at village level in both districts, community group members have high expectations of receiving shared benefits from the existing standing stock. The benefits received from timber can potentially be used as compensation for the community's contribution to managing the state forest areas, serving as a strong incentive to continue their commitment in managing tree-growing within state forests. While government and community can receive the shared benefits directly, as estimated in Table 4-15, the involvement of wood buyers and middle-men can be encouraged by having more efficient/simplified regulations and procedures so their costs can be minimised and they can enjoy the economic rents created. Therefore, they would be able to offer more competitive price at the farm gate.

Table 4-15. Annual net benefits to all stakeholders based on contributed costs at existing standing stock

Description	Unit	Community tree growing schemes		Average
		Sumbawa	Bima	
1. Government	Rp (million)	21	5	13
	AUD	2,486	566	1,526
2. Cooperative	Rp (million)	7	5	6
	AUD	839	629	734
3. Wood buyers	Rp (million)	7	23	15
	AUD	817	2,713	1,765

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

However, it is also important to take into account not only the financial benefits and costs, but also the intangible benefits and costs—the environmental and social benefits and costs—of implementing community tree-growing schemes which were identified with community participation. The community-level analysis focussed on the changes in certain identified environmental and social aspects based on the community's perceptions (Box 4-4). The changes compared conditions before and after the programs were initiated. As these were mainly based on the community's perceptions, they are open to interpretation and challenge. Nevertheless, these perceptions provide a better understanding of the positive and negative impacts perceived by community members, who were both directly and indirectly involved in community tree-growing programmes. Identified environmental aspects varied between villages because they relate to historical conditions that existed before plantations were established, e.g. primary or secondary forest or even deforested areas. Economic, social and environmental aspects were interrelated, for example as discussed below, and so the resulting environmental benefits might incur social and economic costs.

Box 4-4. Overview of community perceptions of costs and benefits of environmental and social factors associated with tree-growing in Sumbawa and Bima

Benefits:

Overall, common environmental benefits of establishing plantations included improvements in having more water catchment areas, reducing floods incidence during heavy rainy seasons. Other benefits included fewer disturbances to forests due to reduced access for grazing and shifting cultivation under community tree-growing programmes.

Costs:

On the other hand, limited access created additional costs to tree growers. First, cost resulted from making fences or sheds for their livestock, and more time had to be allocated for collecting fodder. Second, shifting cultivation practices were also no longer possible, since lands had been managed as community group areas, and specifically became the responsibility of tree grower members. This is considered as a cost to the community. Third, no more opportunities to do shifting cultivation led also to more effort to establish permanent cultivation areas outside state forests, especially where land use competition had been very intensive. Fourth, in some dense tree-populated areas, another cost incurred by the community was the decreasing opportunities to do inter-cropping as the tree canopy became more shady, restricting the passage of sunlight, for example in some areas in Lamenta.

Socially, important cost impacts included the time allocated to managing the community group as part of implementing community tree-growing programmes. This included time required to attend regular community group meetings. However, the benefits have been significant: supervision by community has proved to be effective in controlling damaged areas associated with illegal logging and encroachment of lands, particularly in Lamenta, Sumbawa. As for the long-term benefits, this equals the value of money saved by preventing more standing stock losses.

Sources: Achyar HMA (2005a); FGD in Lamenta village (25/05/2005); FGD in Semamung village (26/05/2005); FGD in Nggelu Village (14/06/2005); FGD in Ntori Village (13/06/2005); Julmansyah (2005); Nawir *et al.* (2007b).

4.4.3. Potential impacts on livelihoods

As indicated from the discussion in the previous section, community involvement was strongly driven by the need to obtain farming land for agriculture crops. Having significant and continuous benefits provides strong incentives for the community to maintain their commitment in the longer term. The community could potentially receive benefits from both inter-cropping and timber. A community household can potentially receive a total income per year of Rp 366,109 (AUD 43) in Sumbawa, which is mostly contributed by timber (Table 4-16).

Table 4-16. Annual net benefit per household from community tree-growing schemes at current standing stocks in Sumbawa and Bima a

Description	Unit	Community tree growing schemes	
		Sumbawa	Bima
1. Total annual net income	Rp/household	366,109	1,723,225
	AUD/household	43	204
2. Income from timber	Rp/household	257,034	1,403,592
	AUD/household	30	166
3. Income from intercropping	Rp/household	109,075	319,633
	AUD/household	13	38

File: Compilation Sumbawa & Bima.xls -Annual net income per HH (3)

Notes:

a. Annual value was estimated based on EAE (Equal Annual Equivalent, see Section 3.3.3, Chapter 3 for detailed description on this assessment criteria) for total household land manage at the average of the 2.5 ha in Sumbawa and 1.6 ha in Bima.

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

In Bima, total income per household per year was higher than that in Sumbawa due to higher income earned from timber. This was despite, the land allocated to inter-cropping was almost 60%, compared to Sumbawa, which was only 15% (see Table 4-8 presented earlier). Low productivity of crops planted under inter-cropping practices was one of the reasons. However, there are potential revenues from inter-cropping that can contribute significantly to total household income in Bima due to low timber trees planted per ha. On average, the total annual income in Sumbawa and Bima potentially could be higher than the level of income of households involved in the *HKm* Programme in other districts in West Nusa Tenggara Province, where the average household income generated was Rp 1.6 million (AUD 194) (FORKOD HKm NTB & PKSK Unram, 2001).

As part of the household income strategy, community tree-growing management is considered a promising opportunity for providing livelihoods for local people, since the return to labour on average is higher than one. This applies for both joint management timber and inter-cropping (Return to labour = 7), and timber management only (Return to labour = 12). Further, the average wage for return to labour is higher than the current wage rate per man per working day, which ranges from Rp 79,050 (AUD 9) to Rp 81,935 (AUD 10). Management only for timber in Sumbawa did not generate a positive labour wage (-Rp 7,948; AUD 1), reflecting that it was not a feasible option due to highly invested government activities, as discussed in Section 4.4.1. The return to labour ratios are higher for timber management only in both Sumbawa and Bima, compared to combined timber and inter-cropping. This represents a higher return to labour, because timber management is very cost effective in these terms, considering no intensive management was required and the community managed timber in conjunction with inter-cropping practices.

Table 4-17. Average return to labour in Sumbawa and Bima at current standing stock[a]

Management		Community tree growing	
		Sumbawa	Bima
1. Timber and intercropping			
1a. Return to labour ratio		7	8
1b. Return to labour	Rp/person working day	79,050	81,935
	AUD/person working day	9	10
2. Timber			
2a. Return to labour ratio		12	12
2b. Return to labour	Rp/person working day	(7,948)	133,382
	AUD/person working day	(1)	16

File: 190514 Compilation Sumbawa & Bima - Return to labour & min wage (2)

Notes:
( ): Negative value
a. Average wage for return to labour was estimated at breakeven point (NPV = 0).
Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Further analysis looked at comparing estimated annual household income from community tree-growing with the average household income in rural areas of West Nusa Tenggara Province, which is Rp 1.26 million (AUD 149) per year[14] (BPS, 2005b). At the current existing standing stock, estimated income from timber and inter-cropping contributes potentially an additional 29% of total average current household income in Sumbawa and 360% in Bima. As discussed in Chapter 6 (Box 6-2), at full standing stock, potential household income from community tree-growing schemes can provide additional income about ten times higher than this average provincial rural household income.

[14] This is adjusted value for 2009.

4.4.4. Benefits in comparison to other investment alternatives

Under the condition of land scarcity, the commercial competitiveness of land use is determined mainly by other investment alternatives, which are agricultural crops planted largely inside state forests. Four possible options for agricultural crops, planted inside state forest and replacing timber trees, were explored (Table 4-18).

Positive annual financial benefits[15] at the current productivity rates are only provided by investment option 2, practised by the community in Bima, using long-term perennial crops with high local and export values for cashew and candle nuts. The benefits are Rp 1.15 million (AUD 136) annually. The other high financial benefit comes from the combination of paddy and mungbean as inter-cropping crops in Sumbawa. The benefits are Rp 7.12 million (AUD 844). At higher productivity using the average at district level, the combination of paddy, corn, soybean, and sesame (-Rp 803,557; AUD 95) is not profitable, whereas other options are. Despite the lower value of estimated annual financial benefits from agricultural crops compared to timber, the estimation of land values from agriculture investment options were much higher values than those from timber; for example, the investment option 2 with a total value of land at Rp 14.2 million (AUD 1,694) and option 4 with total value of land of Rp 89 million (AUD 10,555) compared to that for timber investment at Rp 6 million (AUD 712).

[15] For further analysis using 18% discount rate see Appendix 4-4. 2 for Sumbawa and Appendix 4-5.2 for Bima. Overall, the results using higher discount rate generated higher values.

Table 4-18. Comparisons of tree-growing with other land use alternatives

Investment alternatives [a]	Financial benefits			
	Annual financial benefits [b]		Values of land [c]	
	Rp/year/ha	AUD/year/ha	Rp/ha	AUD/ha
a. Current productivity [d]				
1. Paddy, corn, soybean, and sesame	(2,864,244)	(340)	(35,692,884)	(4,233)
2. Cashew nuts and candle nuts	1,146,398	136	14,285,880	1,694
3. Turmeric and ginger	(3,994,213)	(474)	(49,927,658)	(5,921)
4. Paddy and mungbean	7,120,317	844	89,003,957	10,555
b. Higher productivity [d]				
1. Paddy, corn, soybean, and sesame	(803,557)	(95)	(10,013,557)	(1,188)
2. Cashew nuts and candle nuts	5,805,539	689	72,345,950	8,580
3. Turmeric and ginger	323,330	38	4,041,625	479
4. Paddy and mungbean	15,137,756	1,795	189,221,956	22,441
c. Timber investment	42,216,749	5,007	6,005,298	712

File: Compilation Sumbawa & Bima.xls - Other investment combine Fin

Notes:
( ): Negative value
a. Investment alternatives were based on practices implemented by communities and used for analysis of inter-cropping using 8% discount rate. See Appendix 4-3 for detailed cash flow (Point C).
b. Estimated based on EAE (see Chapter 3, Section 3.3.3 for methodological explanation).
c. Estimated based on TEV (see Chapter 3, Section 3.3.3 for methodological explanation).
d. Current productivity is based on the survey data and higher productivity is based on the average productivity at the district level (see Appendix Table 4-3.23).
Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Internal Rate of Return (IRR) for these different investment options showed an IRR higher than the discount rate (8%) except for timber management in Sumbawa under current conditions (Table 4-19 on comparisons of IRR from tree-growing with other land use alternatives). Low discount rates might not fit with the nature of short-term investment for agriculture crops, such as turmeric and ginger. Nevertheless, the IRRs for most higher-productivity systems indicate that these investment options are comparable and potentially can outperform timber growing against this criterion.

Table 4-19. **Comparisons of IRR from tree-growing with other land use alternatives**

Investment options [a]	Current condition [b]		Improved condition [c]	
	Sumbawa	Bima	Sumbawa	Bima
1. Timber and intercropping	8%	16%	26%	34%
2. Timber	6%	19%	25%	15%
4. Cashew nuts and candle nuts	n.a.	18%	n.a.	39%
5. Tumeric and ginger	41%	n.a.	26%	n.a.

File: Compilation Sumbawa & Bima.xls - Compare feasible investment (2)

Notes:

a. Investment options are those that are financially feasible with positive benefits.

b. Current condition is based on existing standing timber stocks and for inter-cropping crops is based on survey information.

c. Improved condition: for timber at full standing stock, for inter-cropping crops at higher productivity at district level.

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

4.5. Discussion: opportunities and challenges for feasible community tree-growing management

The analysis of the Sumbawa and Bima situations has shown two contrasting cases of how district governments have responded to these opportunities and challenges, particularly in relation to the overarching policy framework initiative at district level. These two different approaches have affected the development and the implementation of community tree-growing schemes, particularly in influencing the institutional, management, tenurial arrangements, and also the factors determining financial feasibility.

4.5.1. Implications of the current overarching policy framework for community tree-growing schemes

The implications of the two overarching policy frameworks, and the challenges and opportunities that result from them, are described here under the two main topics.

The existence of an overarching policy framework for community initiatives at district level has proven to be effective in reducing pressures on state forests by involving communities in tree-growing. Referring to the case in Sumbawa District,[16] community

[16] Referring to *Perda PSDHBM - Peraturan Daerah Pengelolaan Sumber Daya Hutan Bersama Masyarakat* (District regulation on the collaborative forest resource management with the community).

involvement in managing the ex-Perhutani areas inside state forests prevented the areas from being further encroached and illegally logged in the early 2000s. Any programmes initiated externally, such as by the MoF (Ministry of Forestry) on NSF, could be integrated effectively into the local policy framework.

Where the district government failed to secure the rights based on local communities' initiatives and rules, the problems of encroachment inside state forests recurred. As the case in Bima demonstrates, local government failed to secure rights that had proven to be applicable under local conditions and mutually respected by community members inside and outside the village. The local government did not have a strong and clear vision of an overarching policy framework for the development of a community-based forest management strategy, in which a community tree-growing initiative is usually embedded. Existing problems were addressed by using a short-term policy solution that was relevant only at a certain point in time, instead of using a more integrated and longer-term approach.

National policies have improved but need to be refined further, as three main challenges remain. First, the central government (MoF) is still ambiguous in providing formal endorsement of local initiatives, despite the clear and very conducive overarching policy framework provided by the district government of Sumbawa. Second, at the national level, the development of policy and regulations for community forestry in general, and for community tree-growing schemes specifically, has experienced several inconsistent and conflicting changes. This has caused a degree of confusion to district governments in translating the national policy into district-level regulations as the basis for developing each programme on the ground. This was exemplified by the case of the NSF Programme in Sumbawa, which was replaced by another MoF decree supporting the policy and regulations for the *HKm*. Third, programmes initiated by central and provincial governments have often not involved the FDA (Forestry District Agency) effectively in their planning and implementation stages.

4.5.2. Implications for institutional and management arrangements for community tree-growing

The approaches defining the institutional arrangements depended mainly on who initiated the programmes, whether the arrangement was developed based on collaborative arrangements and participatory approaches, or was based mainly on top-down approaches. The implications of these different approaches are discussed below.

Collaborative agreements developed in response to community requests are more effective than the initiatives designed and decided by (central) government. As was the case in Sumbawa, the collaborative agreement under the *Perda PSDHBM* was the basis for implementing the community tree-growing scheme on the ground, which was more manageable from the community's perspective. For example, the process of allocating the lands under the scheme was implemented on a smaller scale, more appropriate to the community's existing management knowledge and skills.

Institutional and management arrangements to support community tree-growing were implemented mainly by providing the secure rights to practise inter-cropping; however, having no rights to harvest timber has been the main impediment to fostering state forest management and developing small-scale commercial tree-growing. The community has had the secure rights to practise inter-cropping but not to full management of timber production and harvesting, even though the community has been actively involved in maintaining and protecting the existing standing timber stocks. Therefore, the intended proportion specified in the national policy, of allocating 70% of land for timber and 30% for inter-cropping, cannot be met, as there are no clear incentives to plant more timber trees. Increasing land pressures outside state forests have instead led the community to give priority to plant more food crops.

Management arrangements often lacked important components, such as conflict resolution mechanisms and mutually agreed sanctions on forest encroachment and illegal logging. Effective local rules that were mutually agreed by all community members and respected by other villages have been shown to be more effective in preventing forest encroachment. This was observed particularly in the case implemented by the community group in Bima (i.e. *Dana Kala* in Ntori Village).

4.5.3. Implications of policy, institutional and management arrangements for financial feasibility and profitability of community tree-growing scheme

As discussed at the beginning of this section, the existing policy framework and also the institutional and management arrangements affected the financial feasibility of community tree-growing schemes and also their commercial feasibility by influencing the tenurial arrangements, which in turn determined the financial competitiveness of tree-growing compared to other land uses.

Under current conditions, community tree-growing schemes combining timber and inter-cropping provide greater benefits for local communities than does timber-based management only. This is mainly because after illegal logging and encroachment the remaining timber standing stocks are not financially viable enough to be managed independently by a timber-focussed management system. Estimated financial benefits reflect the priority of communities in allocating the land to meet the needs of their livelihood strategies. Land allocated to inter-cropping for food crops is given priority over land allocated to timber. While the full standing stock scenario is more promising in the case of timber-focussed management, it may not coincide with the current needs and preferences of communities.

The proportion of land allocated to food crops and timber depends on the incentive signals from each option. Presumably, a higher proportion of land will be allocated to tree-growing if there are secure and clear incentives from timber management authorities. Tree growers in Sumbawa have depended less on forests for inter-cropping compared to those in Bima, due to higher pressures on land for farming in Bima. One positive consequence of a greater dependency of a community on forests is that community tree-growing schemes are more likely to be successful, as long as all the other supporting conditions, such as secure long-term tenure, are in place.

Government initiatives based on high levels of establishment costs and implemented on a large scale were not feasible and did not fit in with the nature of small-scale community tree-growing and management. In the case of community tree-growing schemes in Sumbawa, government expenses accounted for more than 50% of total costs, which was higher than that for the schemes implemented in Bima. With the remaining standing stock, these expenses did not return the estimated potential net benefits, taking into account all the costs required to market all the crops.

Scale and coverage of programme designs determine the financial feasibility and profitability of the community tree-growing scheme. Community tree-growing schemes in Bima were implemented on a much smaller scale, as distinct from those in Sumbawa. These characteristics influence the results of the financial analysis, for example due to the differences in the total areas managed.

Central government initiatives have high transaction costs associated with complicated procedures for applying for rights, as well as in implementation. Although the NSF Programme in Sumbawa was designed to be participative, the institutional arrangements turned out to be complicated and there were different layers of organisational structure, in which the community groups were placed at the bottom. The lengthy procedures resulted in high transaction costs and often did not pay off because the benefits gained from implementation were only in the short-term, e.g. three years in the case of the NSF Programme.

The cost of establishment the plantations and/or community forestry schemes has been used by the government as the basis for reclaiming timber benefits. As part of the forest rehabilitation programme, the government considers the plantation as timber plantations resulting from the rehabilitation programme. Therefore, these plantations has been used by government as the basis for reclaiming potential benefits from harvesting the remaining standing stock from inside community plantations inside state forests. The harvesting rights to these standing stocks belong solely to the government and not to the cooperative, even though the cooperative has been supervising the forest since the *HKm* rights were granted.

To conclude, this chapter highlights opportunities and challenges for the local community in developing the practice of small-scale tree-growing inside state forests under the community tree-growing scheme. Although there are benefits to the local community in obtaining access to state forests, these benefits are not significant enough to enhance small-scale commercial tree-growing development. In Chapter 6, the opportunities and challenges are discussed in comparison to the community-company partnership strategy, which is itself also the subject of more specific discussion in Chapter 5. Further, in Chapter 7 the two strategies will be analysed by looking at their potential contribution of timber to meet the wood gap in Indonesia.

partnership scheme which is dealt [illegible]

Chapter 5. Further, in Chapter 7 [illegible]

potential contribution of timber to meet the [illegible]

Chapter 5. Results and discussion: community-company partnership tree-growing schemes

5.1. Introduction

This chapter is the second of two chapters that discuss the results of the analysis of the socio-economic performance of the two tree-growing strategies in state forests and as guided by research questions 1 and 2. In this chapter, the results and discussion are based on an analysis of community-company partnership schemes (abbreviated to 'partnership scheme (s)' in this chapter) in two case studies: The scheme initiated by WKS (Wirakarya Sakti) in Jambi, and the scheme initiated by FI (Finnantara Intiga) in West Kalimantan (as discussed in Section 3.4.2 of Chapter 3). As discussed in Chapter 1, partnership schemes have become an important part of the strategy used by companies to establish plantations in collaboration with local communities.

Firstly, Section 5.2 focuses on the roles played by the partnership scheme within the broader national context of forestry plantation development in Indonesia. Section 5.3 discusses specifically the partnership schemes in Jambi; Section 5.4 focuses on the partnership scheme in West Kalimantan. These two sections highlight the discussion on institutional arrangements under the state-nested system, and the management foci and arrangements of the partnerships. Points discussed in these two sections provide the basis for the financial analysis in Section 5.5. Section 5.6 then discusses the implications of different institutional and management arrangements and the policy and regulatory framework for the feasibility of the partnership schemes being studied.

5.2. Community-company partnership schemes in forestry plantation development in the national context

Despite different partnership arrangements being put in place, there are common historical contexts and background issues which emphasise the imperative of securing the land before plantations can be developed (further discussed in Section 5.2.1). Understanding the tenurial conditions is also important for identifying some of the continuing challenges during the implementation of the partnership schemes, particularly by placing the discussion in the context of the overall policy framework for forestry plantation development (discussed in Section 5.2.2). The last sub-section

(Section 5.2.3) discusses the implications of the historical context and the dynamics of the tenurial conditions on the current development of partnership schemes implemented by concession holders.

5.2.1. The historical context of the partnership scheme in forestry plantation development

There has been a long history of government efforts since the early 1990s to initiate programmes that would involve communities in partnerships with private concessions. The two most important programmes were *HTI-transmigration* or *HTI-trans* and *Kredit Hutan Rakyat* (Farm Forestry Credit Scheme) (Nawir *et al.*, 2003b).

The *HTI-trans* was introduced jointly in 1992 by two ministries, Forestry and Transmigration (Potter and Lee, 1998). The programme aimed to involve transmigration programme participants in developing an industrial forestry plantation scheme. It was designed such that state-owned forest companies, particularly Inhutani I to V, should provide 40% of the investment while private company concessions would contribute the remaining 60% under a joint venture scheme (Sudradjat and Subagyo, 1993). At the end of 1994, almost 39% of total timber plantations, covering 52,000 hectares (ha), were planted in transmigration estates (MoF, 1997; Potter and Lee, 1998); however, there has been limited progress under this scheme subsequently, due to social conflicts over designated lands (Iman, 2000; Nawir *et al.*, 2007d).

Using Reforestation Funds, the Farm Forestry Credit Scheme provided an opportunity for the local people to develop timber plantations on their own land, as long as the communities had a competent business partner, such as a timber plantation company, which could be either a concession or non-concession holder (Potter and Lee, 1998; Nawir *et al.*, 2003b). WKS was one of the companies that implemented a partnership programme funded by this credit scheme in 1995 (Nawir *et al.*, 2003b). This programme was terminated in 1998 due to changes in MoF policy foci, a financial management dispute between the Ministry of Forestry and the Ministry of Finance, and various other problems as discussed below (Nawir *et al.*, 2003b).

The history of these two initiatives shows that there have been few success stories of government-based plantation forestry initiatives like those represented by these two schemes. The most notable problems have been that, in most programmes, management was top-down, and the private partners did not plan the *HTI-trans* programmes seriously enough because of problems relating to the arrangements by which they were required to contribute their share of investment capital (Nawir *et al.*, 2003b). Other problems centred on programmes dominated by charity-driven administration, for example where the focus was on welfare needs such as company partners building roads and schools instead of involving local people actively in timber plantation development (Pokja Pemberdayaan Masyarakat and APHI, 2007). Therefore, the programmes were only viable in the short term (PESUT, 1996; Kartodihardjo and Supriono, 2000).

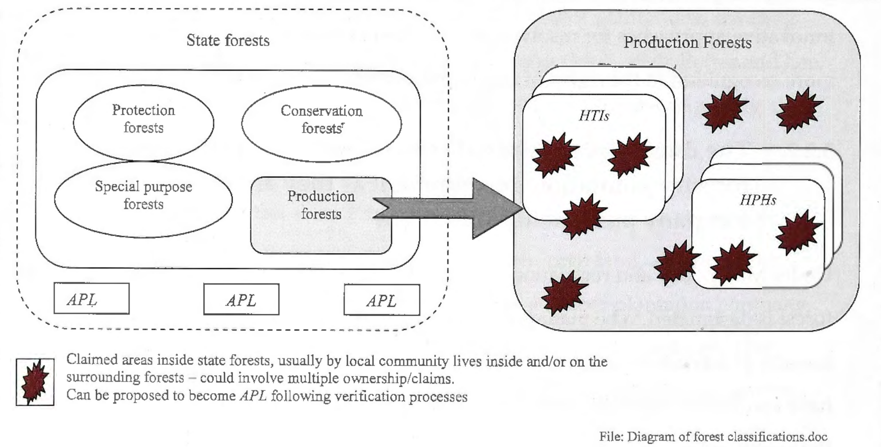
The current partnership schemes were initiated mostly by the companies themselves. The various state-directed programmes failed to foster the necessary collaboration between local community and concession holders (both private and state-owned companies). Timber plantation companies subsequently initiated their own partnership schemes. Most companies have realised that they need to introduce more participatory initiatives to accommodate local people's interests, to use more innovative approaches for resolving the increasing level of land conflicts, and to give more recognition to the rights of communities (Nawir *et al.*, 2003b; Nawir, 2011).

5.2.2. The dynamics of tenurial conditions impeding the national forestry plantation development as they affect the community-company partnership initiatives

Under MoF policy and regulations, within the state forest classification, production forest is designated to be managed for commercial purposes through logging and forestry plantation management (Figure 5-1). Conflicts over land inside state forests have continually impeded state forest management, both before and after the Reformation Era when the decentralisation policy was introduced, although the magnitude and the complexities of the conflicts have become greater subsequent to Reformation (Julmansyah *et al.*, 2005; Sumardjani, 2007). The problems arising from these claimed areas have intensified since the Reformation Era began in 1998, with populations increasing due to immigration (Sumardjani, 2007).

These conflicts have arisen mainly because communities have been living within, and in areas surrounding, the state forests (Kartodihardjo and Supriono, 2000; Colfer and Byron, 2001; Sunderlin, 2008). Therefore, forest areas granted to concessionaires have always included lands that are claimed by local communities. In practice, these conflicts have to be resolved by the concession holders as a condition of being granted the concession areas (Nawir and Santoso, 2005). The areas claimed often involve cases of multiple layers of ownership by different community members: simply paying direct compensation, as in the past, has not been effective in resolving such land claims (Nawir *et al.*, 2003b).

Adding to the complications in resolving the land claims has been the obligation to pay the land and property tax (*PBB-Pajak Bumi dan Bangunan)* placed by local government on communities that claim land inside state forests and/or concessions (Head of Cooperative 2, pers. comm., 9 January 2009). This is given by communities as a reason for the claimants' rights over the land; that is, they have fulfilled their taxation obligation to the government as the basis for claiming their rights.



Notes:
APL: Areal Penggunaan Lain: forested/non-forested areas that are allowed to be converted to other purposes
HTIs-Hutan Tanaman Industri: concessionaires receiving rights from MoF to develop industrial timber plantations inside production forests
HPHs-Hak Pengusahaan Hutan: concessionaires receiving logging rights from MoF inside production forests
Sources: Adapted from MoF (2009g; 2010b).

Figure 5-1. The dynamics of tenurial conditions behind the partnership schemes initiatives

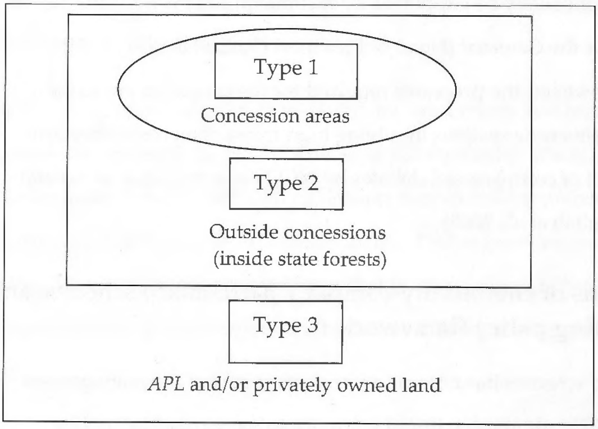
Under MoF regulations, these claimed lands may be excluded from allocated concession areas and can be exchanged for other areas in different locations inside state forests by those who formally hold the rights granted by MoF, such as concessionaires (MoF, 2009g; 2010b). Another possibility is that if these areas are included as *APL-Areal Penggunaan Lain*, the company can submit an application to the MoF for the areas to be released from state forest tenure, and they can then be converted for other purposes, including for use in developing timber plantations (MoF, 2009g; 2010b). Such an application must usually be supported by recommendations from the *Bupati* (Head of District) and/or the *Governor* (Head of Province) (Fathullah *et al.*, 2005; ComForLink, 2005). However, the processes required for these options are lengthy and subject to very bureaucratic systems involving high transaction costs; they also often become the subject of controversial debates by NGOs over the issue of natural forest conversion (Fathullah *et al.*, 2005).

5.2.3. Current status of community-company partnership schemes and the overarching policy framework

Developing partnership schemes has become an important part of the management strategy of *HTIs* and *HPHs*, although without reference to particular MoF policy frameworks and regulations, since these did not exist when companies initiated the schemes in the late 1990s (Nawir and ComForLink, 2007). However, partnerships developed by *HTI* companies have been more prominent than initiatives developed by *HPH* concessionaires as part of their Community Development (CD) programmes, and often the initiatives are also attached to their CSR (Corporate Social Responsibility) schemes. The current status is discussed in Section 5.2.3.1. For *HTI* companies, there are at least four relevant procedures involved in implementing *HTIs* that also apply to partnership schemes, as discussed in Section 5.2.3.2.

5.2.3.1. Current status of the community-company partnership scheme

Partnership schemes independently initiated by companies in Indonesia can be categorised into three types (Figure 5-2) (Nawir and ComForLink, 2007). The first is a partnership scheme initiated by a company with communities that own or claim lands inside concession areas granted to either *HTI* or *HPH* companies (Type 1), as the case may be; this can be described as a collaborative arrangement under the state-nested system (see Section 2.4.1.2). The second is a scheme developed inside state forests, but on land areas that are not part of the company partner's concessions (Type 2). The third (Type 3) scheme is used on privately owned areas belonging to community members or areas categorised as *APL-Areal Penggunaan Lain,* which are either forested or non-forested areas that are allowed under MoF policy to be converted for other purposes (Fathullah *et al.,* 2005; ComForLink, 2005). Specific partnership programme titles vary from company to company.



Source: Adapted from Nawir and ComForLink (2007).

Figure 5-2. Types of partnership programmes developed by private companies

Companies commonly developed the Type 1 programme as part of their conflict resolution mechanism with communities that were claiming lands inside their concession areas. Type 2 is less common and developed mostly in response to the demands of landholders, who have particular rights through a governor's decree. Type 1 and 2 programmes come under the supervision of the Directorate General of Forestry Production Management *(Ditjen BPK),* because they are developed inside production state forests. The Type 3 programme, being outside state forests, is supposedly overseen by the Directorate General of Land Rehabilitation and Social Forestry *(Ditjen RLPS),* which has not given its full attention to the programme (Nawir and ComForLink, 2007). Partnership schemes in the subsequent discussion in this chapter are focussed on Type 1 and Type 3 schemes developed under *HTI* as the most common type of partnership scheme being implemented by companies.

The main approach implemented by *Ditjen RLPS* has been to focus on replanting programmes through the community forestry programme, particularly in degraded forest areas inside state forests (as discussed in Chapter 4). Several studies have highlighted the need to have a clear link between the planting programmes and the market (e.g. Lamb and Tomlinson, 1994; Chokkalingam *et al.*, 2005; Nawir *et al.*, 2007e). This link to the market is important for ensuring the continuity of any particular programme. Programmes are often discontinued after the project-based funding ends; this has been a common pattern in the project implementation for more than three decades, for example, in cases of reforestation projects (Nawir *et al.*, 2007d).

In all types, partnerships have been initiated by a company through involving members of communities—in which individuals have organised themselves into a tree-grower or farmer group or as a cooperative—either as individuals or collectively, with this process usually facilitated by local government extension officers or NGOs.[17] Increasingly, companies expect the partnership scheme will be initiated through more business-oriented community enterprises, such as *BUMDES-Badan Usaha Milik Desa* (village-owned enterprises, see glossary for description in Appendix 1-1) (ComForLink, 2005). While FI has developed partnership schemes mostly inside concession areas (Type 1), WKS has been developing two different partnership arrangements. The first, the *Hutan Tanaman Pola Kemitraan (HTPK Scheme)*, or forestry plantation, is based on a Type 1 partnership arrangement developed inside the company's concession. The second is a *Hutan Rakyat Pola Kemitraan (HRPK)*, or community forestry plantation, scheme based on a Type 3 partnership arrangement initiated on private land owned by an individual or by a community as a group. Due to the complexities of developing the *HTPK scheme*, the company is now involved more in the *HRPK Scheme*. Both schemes are discussed in this chapter.

The existing partnership areas based on current initiatives have not been recorded systematically by the MoF. Based on the limited statistical records, most of which refer

[17] A tree grower or a farmer group usually has an informal nature, in that it is formed to discuss matters related to farming practices, while a cooperative has to be registered with the Ministry of Cooperatives and Small and Medium Enterprises. Tree growers partnering with WKS have organised themselves in cooperatives, while in the current FI Scheme mostly they are part of informal tree grower or farmer groups.

to Sumatra-based companies, the total area of various partnership schemes developed by ten companies accounted for 180,003 ha in 2007 (an average of 66% of total concessions) (Table 5-1). This is about 4% of the total timber plantation area in 2008 (MoF, 2010c).

Table 5-1. Extent of different types of timber plantation partnership areas (2007)[a]

Location of the initiated partnerships	Area (Ha)	Number of households involved
1. Concession areas (Type 1)	119,339	22,411
2. Non-concession areas inside state forests (Type 2)	1,000	No information
3. Community areas or APL (Type 3)	59,663	15,162
Total	180,003	37,573

Notes:
a. Information is limited only to ten companies, which may be underestimated.
Sources: Adapted from: Director of Tanjung Redeb Hutani (2006), Adhianto (2007), *Pokja Pemberdayaan Masyarakat*, and Pokja Pemberdayaan Masyarakat (2007)*and APHI* (2007).

The total for Type 1 programmes, implemented by four companies, is 119,339 ha; Type 2 is implemented by two companies in Jambi and East Kalimantan on about 1,000 ha; and the Type 3 partnership, implemented by five companies, has reached 59,663 ha. As mentioned above (Section 5.1), companies in the case study sites are now more interested in developing the Type 3 partnership scheme, which is on APL and/or privately owned land. This is part of a strategy to access more land with less conflict and leave the conflict areas inside concession areas unresolved or return them to the MoF to be swapped for other areas.

Despite the development of partnership schemes implemented through company initiatives, and about ten years of experience in their implementation, the existing schemes generally lack the supporting legal frameworks provided by the MoF, particularly for the partnership scheme initiated by this company. This has caused several challenges to the company, as discussed further in Section 5.2.3.2. The cases of partnership schemes developed by the two companies discussed here are among the few good examples of these schemes in Indonesia, although neither has yet sufficiently met the criteria of mutual benefit for both party to the extent intended (Nawir *et al.*, 2003b; Nawir and Santoso, 2005). Their experiences have been valuable as examples for other Indonesian companies and they have been visited many times by national and international stakeholders as well as by the Ministry of Forestry (MoF), as reference points from which to develop a policy for a new model of plantation development that is expected to be initiated by the community through tree-grower cooperatives, or other types of community groups, under the *HTR-Hutan Tanaman Rakyat* (Community-based Forestry Plantation Programme) (Nawir and ComForLink, 2007). The partnership scheme is included as one of the models for implementing the community-based forestry plantation programme inside state forests under *HTR* (see Box 5-1) (Nawir and ComForLink, 2007; MoF, 2009f). Since the *HTR* programme was initiated and designed by *Ditjen BPK*, the implementation of *HTR* does not take into account the partnership schemes implemented outside state forests (Type 3).

The second and third models were designed to involve state-owned or private companies. However, although all three models refer to the *Permenhut-Peraturan Menteri Kehutanan* (MoF regulation) No. PP. 6/2007, both the regulation and the *Permenhut* fail to define clearly the specific roles of these companies and their involvement, or to give a clear definition of 'partnership'. Up to January 2010, the extent of *HTR* allocated in response to the proposals submitted to the MoF accounted for 480,303 ha; however, only 37,640 ha (about 8%) were ratified by the *Bupati/Walikota* (Head of District/Municipality) and had received approval to be implemented (Staff *Ditjen BPK*, pers. comm., 1 February 2010) (see discussion in Section 7.2 on the potential timber production coming from this and other small-scale tree-growing strategies). Only two *HTR* programmes had been initiated by companies, while the other 12 approved applications were proposed by cooperatives supported by either international or national NGOs and/or progressive district governments, such as Sumbawa District. Local government in this district has proposed to upgrade the *HKm* rights into *HTR* (see discussion on *HKm* Programme in Sumbawa under Section 4.2, Chapter 4).

Box 5-1. The three HTR models included in the MoF Decree
1. The *HTR* independent model The independent *HTR* schemes are implemented directly by local communities, which are expected to establish farmer groups and submit proposals to the district heads. Subsequently, on the recommendation of the district head, the government allocates areas and *IUPHHK-HTR* permits to the individual members of these groups. The head of each group is responsible for the development of the *HTR*, applications for and repayment of loans, as well as organising markets for any timber produced. In addition, every member is responsible for reminding the other members to fulfil their obligations. Local governments will assist in the development of these independent *HTR* schemes. **2. The *HTR* partnership model involving state-owned or private *HTI* companies** In this *HTR* development model, local communities establish groups, which the district head then recommends to the Ministry of Forestry. The government then grants *IUPHHK-HTR* permits to individuals and determines a partner for each group. The appointed partners are responsible for inputs, training, assistance and making markets available for any timber produced. **3. The *HTR* developer model** In *HTR* development through the developer scheme, private or state-owned companies act as planters. The government then surrenders the plantation forests to designated communities (individuals/groups) willing to take on the responsibility of becoming developer scheme *IUPHHK-HTR* holders. Any expenses for developing plantations are calculated as loans to *IUPHHK-HTR* holders to be paid back in stages in accordance with the credit agreements. Source: Adapted from MoF (2009f).

5.2.3.2. Related regulations and their implications for *HTI* development as they affect partnership scheme development

As mentioned briefly in the introduction to Section 5.2, overall, *HTI* companies initiating partnership schemes have to follow similar regulations to those for *HTI* development. The regulations cover the different stages required, from initiation to harvesting and transporting timber from partnership scheme areas (ComForLink, 2005). These regulations, imposed either by the MoF/FDA and/or by district government, play a prominent role in regional autonomy. In general, these procedures are: (1) procedure verifying the legal status of the communities' land; (2) procedure for proposing the areas to be allocated as APL; (3) procedure for preparing and clearing the land (see Figure 5-3); and (4) procedure for harvesting and transporting timber to the processing mill (see Figure 5-4) for timber harvested inside concession areas inside state forests, and see Figure 5-5 for timber harvested from privately owned land. Companies are familiar with most of these procedures, unlike their community partners, who are willing to allow the company partner to handle these procedures.

To some extent, the procedures required have caused additional costs in initiating and implementing the partnership schemes compared to the business-as-usual development of plantations under the HTI scheme (see Section 5.5 for discussion of the economic implications).

(1) Procedure in verifying the legal status of communities' lands

In the preparation stage before initiating the partnership arrangement, the company has to check the status of the communities' land, mainly by verifying its legal status. This is important to ensure minimal risk of land conflicts that might prevent timber from being harvested at the end of the rotation. Documentation confirming the legal status of land ownership is also important for obtaining the documents required for transportation of timber cut from the state forests or the partnership areas to the company mill, as discussed in point (3) below.

The procedure followed in verifying the legal status of community lands faces a big challenge, mainly due to the contradiction between the land papers recognised by the formal system and the common land papers held by most community members. There are five possible types of land papers provided by prospective community partners to be included in the partnership scheme. A Land Certificate is the formal notification of land ownership status recognised under the national land classification system and ratified by the *BPN-Badan Pertanahan Nasional* (National Land Agency) (see point No. 4 of Table 5-2). However, the most common land papers held by community members interested in joining partnership schemes are *SKT-Surat Keterangan Tanah* and *SPH-Surat Pengakuan Hak* (see points nos. 2 and 3 of Table 5-2). Considering that these types of land papers are not recognised under the formal national land classification system, the Ministry of Internal Affairs, under decree No 593/5709/SJ of 22 May 1984, gives an instruction to the Heads of Villages and Sub-Districts not to provide a letter of endorsement for the *SKT* and *SPH* (ComForLink, 2005).

Table 5-2. Categories of land status as included in company community partnerships

Categories of land status	Requirements and implications for rights assurance
1. Communal land belongs to the village (including *adat* lands, but not *tembawang* [b])	• Community members respect the land status as required by *adat* or customary rules • May not be administered within the land status categories according to state law
2. Individually owned land based on paper from the Head of Village on land status or *SKT-Surat Keterangan Tanah*	• Approved by the Head of the Village and respected by communities in neighbouring villages • Can be upgraded to obtain land certificate from the office of National Land Agency (*BPN-Badan Pertanahan Nasional*) at provincial level
3. Individually owned land based on paper from the Head of *Dusun* (sub-village) or *SPH-Surat Pengakuan Hak*	• Approved by the Head of *Dusun* (sub-village) and may be respected between villages • May be upgraded to obtain land certificate with additional administration procedures
4. Individually owned land based on land certificate	• Legalised land status and approved by all levels of government authorities • Respected by all parties
5. Paper on right over transmigration areas	• Secured land status under government resettlement/transmigration programme • Usually respected by all parties

Notes:

a. Land status/user rights of local people is a sensitive issue in Indonesia; in this study it is broadly interpreted that this does not necessarily mean land title.

b. Mostly in Kalimantan: this does not include *Tembawang*, which is communal traditional land planted with different kinds of trees (usually fruit trees).

Source: Adapted from Nawir *et al.* (2003b).

Unfortunately, few community members hold the formal land certification imposed by BPN, which is to be submitted subsequently as proof in the process of validating the origin of cut timber as required by MoF regulations (see point (4) below). One of the reasons for this is that the processes involved in obtaining this certification are lengthy and very expensive, and most communities cannot afford it (Potter and Lee, 1998; Nawir *et al.*, 2003b; ComForLink, 2005). The lack of a database of land registration that would define land boundaries has made the processes time-consuming and complicated and often they overlap with planning for oil palm plantation development. In most cases of trees grown by communities outside the state forests, the local buyers or brokers often assist the tree owners to obtain this land certification (WWF Indonesia Program Nusa Tenggara, 2007b; Kurniawan *et al.*, 2008) if a community wants to sell the timber.

If any company initiating a partnership insisted on the requirement for having the land certification for every piece of land of every prospective community partner, little if any of the land would meet the requirements adequately. On the other hand, the community would not have the opportunity to utilise their unproductive, abandoned or idle lands to gain additional income. So, in reality, the most common types of land papers provided by prospective community partners such as *SKT* and *SPH* are accepted by companies but with some degree of risk, for example when companies have to deal with problems of land claimed by other parties, e.g. an oil palm plantation company.

In relation to spatial development regulations for the *HTI* scheme, timber plantations can only be developed on 70% of total concession areas, while the remaining 30% must be allocated as follows: 10% for planting local species with high commercial values (*tanaman unggulan*); 5% for crops supporting local livelihoods (*tanaman kehidupan*); 10% for protected areas (*kawasan lindung*); and 5% for infrastructure development (*sarana prasarana*) (MoF, 2009b). As further discussed in Section 5.4, the partnership scheme initiated by FI inside the *HTI* concession has to include the development of rubber plantations to fulfil the obligation to develop crops supporting local livelihoods. This has affected the nature of the feasibility and profitability of the partnership scheme and the level of benefits received by community partners at the household level (see Section 5.5.4.3 for further discussion).

(2) Procedure for proposing the areas to be allocated as APL

Based on MoF forest classification, some prospective areas for the partnership scheme are in forests defined as *APL* (discussed in Section 5.2.2). These are production forests that can be converted, for example, into estate crops or transmigration areas (ComForLink, 2005; Baplan, 2008). Under the different priorities for land use set by the MoF and district governments, it has been difficult for companies to propose these areas as partnership areas to be developed together with communities, since the proposal to the MoF has to be based on a recommendation by the *Bupati* (the Head of District) or the Head of the Province (Governor).

The procedure for proposing areas to be allocated as *APL* is regulated by the MoF Decree No. SK. 48/Menhut-II/2004 on the designation of forest areas with regard to changes of status and function (MoF, 2004a). Applications must be submitted to the Minister of Forestry, with several documents attached: technical advice provided by the FDA or PFA for areas covering inter-provincial areas, or a district, or a city; a letter of recommendation from the Head of District or Governor for areas covering inter-provincial areas, or district, or city; and maps of the areas following a full assessment by an integrated assessment team, which must also provide a recommendation to support/reject the application (MoF, 2004a).

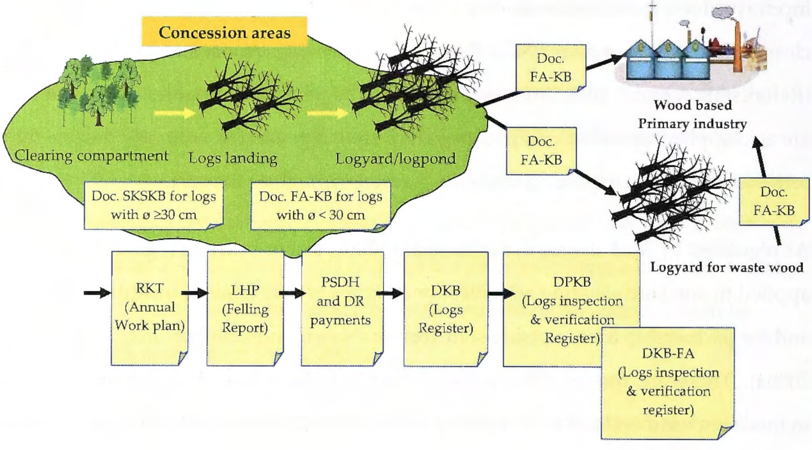
Proposals for such use of these areas are highly competitive with proposals for other purposes, such as oil palm plantations. Furthermore, there are different perceptions between the MoF and the district government in interpreting the purposes to which these areas can be converted (Nawir *et al.*, 2007d). The land and forest database based on the *TGHK-Tata Guna Hutan Kesepakatan* (Forest Land Use Consensus) developed and used by the MoF is often in conflict with the understanding or database used by the district government (Nawir *et al.*, 2007d).

(3) Procedure for preparing and clearing the land

Regulations relating to the procedure for preparing and clearing the land refer to MoF Decree No. P. 55/Menhut-II/2006 (on the procedure for administration of timber production from state production forests), and to MoF Decree No. P. 18/Menhut-II/2007 (on the procedure for applying, collecting and payment of Forest Resource Rent and Reforestation Fund) (MoF, 2006c; 2007a). As discussed in point (4) below, similar regulations cover the procedures for harvesting and transporting timber as well.

Similar regulations are applied to industrial-scale operations and small-scale partnership areas in terms of land preparation and land clearing. As can be seen in Figure 5-3, several procedures must be implemented; these are very important in ensuring that the validity of wood coming from a legal source can be checked. However, similar regulations are applied to partnership schemes implemented on community land or outside concessions or state forest. These regulations have resulted in high transaction costs in implementing the partnership scheme and do not serve as incentives for a company to develop the scheme, particularly since all wood cut and cleared is subject to similar *PSDH-Pungutan Sumber Daya Hutan* and *DR-Dana Reboisasi* (Reforestation Fund) contributions that have to be paid by companies. Similar levies are also applied to timber cut from trees that have regenerated naturally despite the forest area status being changed to non-forest area, such as the APL.

As regulated by MoF decree P. 62/Menhut-II/2008, a zero-burning regulation is now applied to any land-clearing activities for all types of concessions, including the *HTI*, and for partnership areas outside state forests (Nawir and ComForLink, 2007; MoF, 2008a). Therefore, the regulations that should be followed for land clearing are similar to those imposed on land to be developed as industrial forestry plantations inside state forests. However, the zero-burning regulation is not supported by alternative regulations defining simpler techniques for land clearing on community land outside concessions (ComForLink, 2005). For example, the permit for timber waste management (*Izin Pemanfaatan Limbah)* as an alternative to burning also follows similar complicated procedures of land clearing, which are not very helpful in supporting the implementation of the zero-burning technique (ComForLink, 2005).



File: Land clearing Diagram TUK.doc

Processes required for land clearing inside *HTI* concession areas/*APL-Areal Penggunaan Lain*:

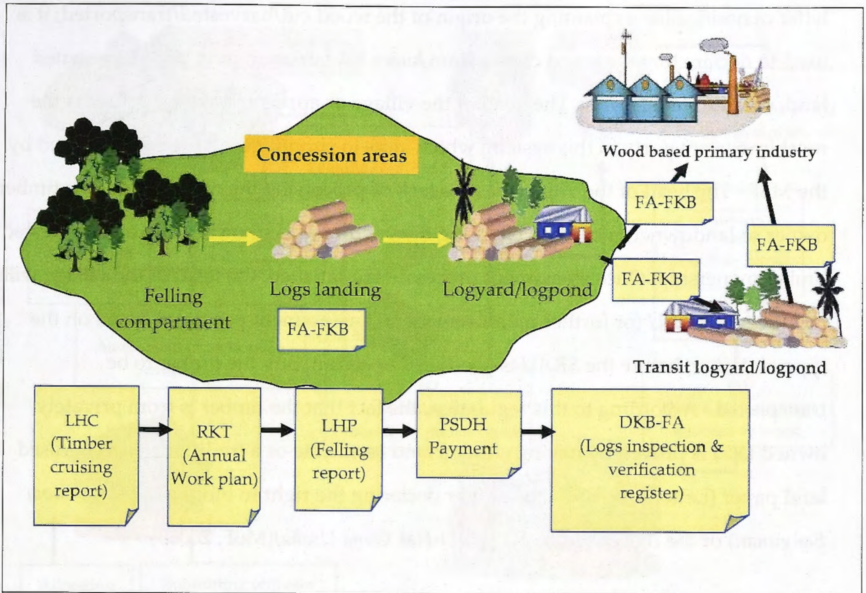
(1) Producing the *LHC-Laporan Hasil Cruising* (Timber Cruising/Inventory Report)
(2) Producing the *RKT-Rencana Karya Tahunan* (Annual Working Plan)
(3) Writing up the *LHP-Laporan Hasil Produksi* (Felling report)
(4) Making payments for *PSDH-Pungutan Sumber Daya Hutan* (Forest Resource Rent Provision) and/or *DR-Dana Reboisasi* (Reforestation Fund)
(5) In the case of round logs, the FDA produces the *DKB-Dokumen Kayu Bulat* (Document of Round Wood) confirming the *SKSKB-Surat Keterangan Sahnya Kayu Bulat* (Round wood legality letter)
(6) For the case of small logs with ø < 30 cm, the FDA produces (*DKB FA-Dokumen Kayu Bulat-Faktur Angkutan* (Document of Round Wood-Transporting Invoice)
(7) Company issues the *FA-KB-Faktur Angkutan Kayu Bulat* (Transporting Invoice for Round Wood) to be attached to wood being transported to mill or other industries
(8) Independent verification is conducted at check points and issues the *DPKB-Dokumen Pelaporan Kayu Bulat* (Reporting Document of Round Wood).

Sources: Adapted from MoF (2006c; 2007c; 2008a).

Figure 5-3. Procedures and administrative requirements for land clearing applied to plantation concessions and partnership schemes

(4) Procedures for harvesting and transporting timber

Similar regulations are also applied to timber harvested from company plantations and from partnership areas, as well as for transporting this timber to the processing mill or any other destination (Figure 5-4). The existing timber administration procedures are important for ensuring the legality of wood coming from responsible sources, e.g. not from illegal logging. Timber coming from partnership scheme areas inside state forests is subject to similar regulations.



Processes required for harvesting inside *HTI* concession areas/*APL-Areal Penggunaan Lain* and transporting timber to mill or other industries:

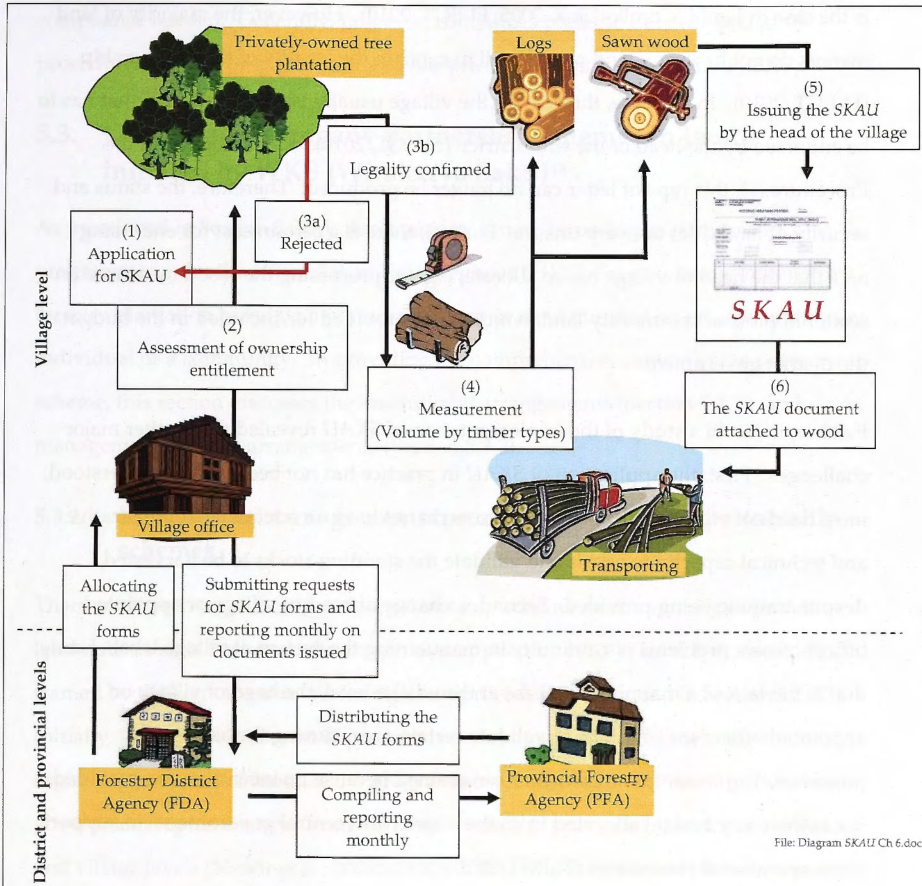
(1) Producing the *LHC-Laporan Hasil Cruising* (Timber Cruising/Inventory Report)
(2) Producing the *RKT-Rencana Karya Tahunan* (Annual Working Plan)
(3) Writing up the *LHP-Laporan Hasil Produksi* (Felling report)
(4) Making payments for *PSDH-Pungutan Sumber Daya Hutan* (Forest Resource Rent Provision)
(5) For *HTI* with small round wood production, the FDA produces the *DKB FA-Dokumen Kayu Bulat-Faktur Angkutan* (Document of Round Wood-Transporting Invoice)
(6) Company issues the *FA-KB-Faktur Angkutan Kayu Bulat* (Transporting Invoice for Round Wood) to be attached to wood being transported to a mill or other industries
(7) Independent verification is conducted at check points and the *DPKB-Dokumen Pelaporan Kayu Bulat* (Reporting Document of Round Wood) is issued.

Sources: Adapted from MoF (2006c; 2007c; 2008a).

Figure 5-4. Requirements for harvesting and transporting timber from concession areas applied to partnership schemes

Since 2007, fast-growing timber, such as acacia, harvested from community-owned land is now subject to timber administration procedures as defined by MoF regulation No. P. 33/Menhut-II/2007 on *SKAU-Surat Keterangan Asal Usul Kayu* (certificate of origin for transport of timber production coming from community or privately owned forests)(MoF, 2007d). This recent regulation aims to simplify the procedures required (Figure 5-5). Specifically, the new regulations declare that timber coming from community members or privately owned lands can be transported using the *SKAU* (MoF, 2006b; d; 2007d; 2010a; Daryanto and Purwonegoro, No year). The *SKAU* is the letter of notification explaining the origin of the wood cut/harvested/transported; it is used to declare that the wood comes from *hutan hak* or community privately owned land, outside state forests. The head of the village or appointed village officer is the most important party in this system, which aims to simplify the processes required by the MoF. The head of the village has the task of processing the request from the timber owner or landowner, including checking the validity of land ownership and harvested timber ownership. Once assessment processes are satisfied, the head of the village will produce the *SKAU* for further measurement and assessment processes based on the type of timber, before the *SKAU* is produced to accompany the timber to be transported. According to this regulation, the fact that the timber is from privately owned land is proven by having either a land certificate or a traditionally recognised land paper (Letter C or *Girik*); or a letter declaring the right to build (*HGB-Hak Guna Bangunan*) or the right to cultivate (*HGU-Hak Guna Usaha)*(MoF, 2006b).

However, until now there have been delays in applying the *SKAU* to verify the legality of wood coming from community or privately owned land outside state forest. For example, the FPA in Jambi did not implement the MoF regulation on *SKAU* until April 2008 (FLEGT, 2010). A land ownership paper is also required when applying for the *SKAU*, particularly the paper that is ratified by the *BPN* under the formal privately owned classification system (see point (1) above).



Notes:

(1) Application is submitted to head of the village by tree/land owner

(2) The head of the village/appointed officer conducts an assessment of the legality of the land ownership

(3) Legality is confirmed based on land certificate and other land papers as recognised by *BPN-Badan Pertanahan Nasional* (National Land Agency)

(4) Measurement of the harvested wood volume ready to transport based on type (logs or sawn wood) and species

(5) The head of the village issues the *SKAU* for the specific wood assessed

(6) The *SKAU* is attached to the wood transported.

Sources: Adapted from MoF (2006b); MoF (2010a); FLEGT (2010).

Figure 5-5. Procedures for producing a *SKAU-Surat Keterangan Asal Usul Kayu* (certificate of origin for transporting timber production coming from privately owned land)

As discussed earlier (Section 5.2.2), the only land notification paper held by prospective community partners in partnership schemes is usually the *SKT* or *SPH*, as is the case in Jambi (ComForLink, 2005; FLEGT, 2010). However, the majority of land owners do not have any land paper at all to confirm the legality of their ownership (FLEGT, 2010). In this case, the head of the village usually issues a new *SKT* that has to be endorsed by the head of the sub-district (FLEGT, 2010). As mentioned in the Procedure (1), this type of letter can no longer be produced. Therefore, the status and security of land titles are very unsure. Further, there is a certain cost for endorsing *SKT* that the head of village has to allocate, e.g. for processing the wood measured on scattered plots of community land, which is not provided for/included in the budget of the district government.

Further, in Jambi a study of the implementation of *SKAU* revealed three other major challenges. First, the application of *SKAU* in practice has not been widely understood; most heads of villages or appointed officers do not have an adequate administrative and technical capacity to assess and validate the standing stocks to be harvested, despite training being provided. Second, a change of head of village or appointed officer creates problems of continuity in maintaining the system at village level. Lastly, due to the lack of a mapping database at the village level, the head of village or appointed officer may hesitate to validate certain areas during the assessment processes. Implementation is further constrained because no incentives are provided, nor is there any budget allocated from the district and central governments to support these operational procedures (FLEGT, 2010).

Despite the recent regulation on *SKAU*, companies generally have to follow similar procedures under the current policy framework, whether these are for *HTI* development or partnership schemes outside state forests on community or privately owned land. The company is responsible for paying all the associated costs, e.g. in administering the *SKAU* or timber harvesting and transportation, since community partners do not have any financial capital, as further discussed in Section 5.5. Despite their familiarity with most of these procedures, the need for companies to take care of these procedures, including bearing the transaction costs, could be used by them to suppress the buying price of community timber. Unless a tree-grower cooperative has a strong institutional and organisational capacity, it is not possible to handle the compliance burden. Generally, however, companies prefer to have simplified procedures and are prepared to offer a fair price (Nawir and ComForLink, 2007).

5.3. Community-company partnership schemes in Jambi initiated by WKS (Wirakarya Sakti)[18]

As mentioned in Section 5.2.3.1, this company is now focussing its partnership programme under the *Hutan Rakyat Pola Kemitraan (HRPK Scheme)*, or community forestry plantation based on a partnership arrangement initiated on private land by an individual or a community. In providing the comprehensive context of the partnership scheme, this section discusses the institutional arrangements (Section 5.3.1.), and management foci and arrangements (Section 5.3.2).

5.3.1. Institutional arrangements: processes in initiating partnership schemes

There are seven stages in initiating a partnership scheme on community or private land outside state forests, under the process applied by WKS (Figure 5-6); these are framed by different regulations for different procedures (discussed in Section 5.2.3.2). Initially, to attract the interest of prospective community partners, the company organises sessions to introduce the programme not only to the community, but also to government representatives from different levels, e.g. provincial, district, sub-district, and village levels (Nawir *et al.*, 2003b; WKS, 2008). The involvement of government representatives is important for gaining support in the administration of the formal process required, particularly by having them act as witnesses during the process of signing the contractual agreements as the partnership arrangements progress.

Land eligibility is one of the most important requirements for participation in the partnership: it has to satisfy the condition that the land's legal status be clearly defined and not be under dispute or conflict (Nawir *et al.*, 2003b; Unja, 2007). However, this has been very difficult to implement on the ground due to formally recognised ownership documents not being in the possession of most households.

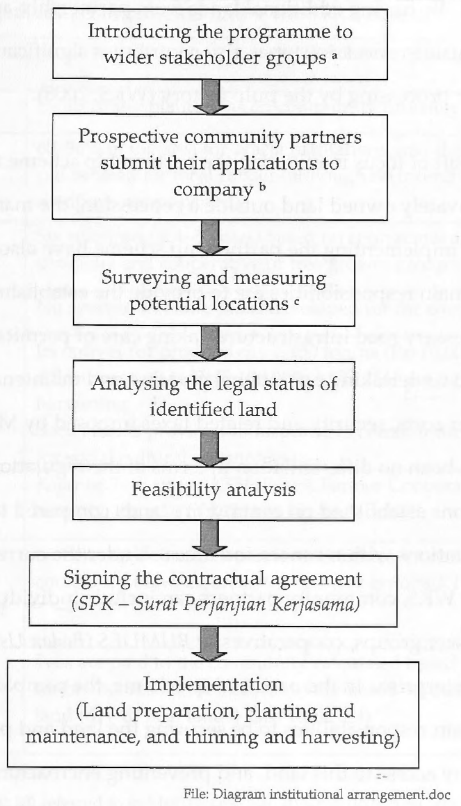
---

[18] See Section 3.4.2 (Chapter 3) and Appendix 5-1 for information on company profile.

Prospective community partners in the partnership schemes have to submit their letter of request to the company; this is followed by the company field staff assessing the potential locations. This includes the process of identifying the land boundaries together with the community members, which might take quite some time. The company then analyses the legal status of the land ownership. The authenticity/validity of community land ownership is often declared based on an informal local land paper endorsed by the head of the village and/or head of the sub-district, as discussed in Section 5.2.2.

Signing the contractual agreement is the most important part of the process of initiating the partnership scheme. The legality of the contract is supported by having it bound under a Notary Deed, after it is signed by the owner, the head of the village (*kepala desa*), the head of the sub-district (*camat*), the head of the district (*bupati*), and the Forestry District Agency (FDA) (Nawir *et al.*, 2003b; WKS, 2008).

However, it is understandable that the company will try its best to minimise the uncertainty and risks involved in securing the timber at the end of each rotation. Many members of tree-grower cooperatives or community groups bound under partnership agreements do not have a copy of this contractual agreement and do not have a good understanding of the legal consequences of signing this contract (Nawir *et al.*, 2003b, Fieldwork in Jambi, 2009). In all the case study sites of WKS, the heads of the cooperatives confirmed that they were the ones who had the contract and that, due to the high degree of confidence accorded them, the members agreed with this condition (Fieldwork in Jambi, 2009). Therefore, it is even more difficult for a company to enforce the legal consequences for any case of breach of contract, particularly under the current conditions where there is a background of negative perceptions towards any company initiatives.



Notes:
a. Wider stakeholders include local government at district and village levels.
b. For areas inside concessions, the processes in the past included establishing the formal cooperative.
c. For areas inside concessions, the potential locations should be proposed to MoF to be allocated under partnership arrangements.
Source: WKS (2008).

Figure 5-6. Processes in initiating the partnership scheme implemented by WKS

5.3.2. Management foci and arrangements

Under the current *HRPK* arrangement, the main objective of WKS is to develop plantations together with communities, sharing the benefits from timber harvesting with the community, utilising unproductive land, creating working opportunities within communities living in the surrounding forests and as part of the CSR Programme (WKS, 2008). In addition, companies use the partnership scheme as a way to improve community livelihoods, hoping that the forestry plantations on community lands will serve as a buffer zone from communities and/or other companies occupying concession areas. By having additional lands from partnership areas the establishment of plantations outside concession areas also contributes significantly to the supply of raw materials for processing by the pulp factory (WKS, 2008).

Following this shift of focus in initiating the partnership scheme from inside a concession to privately owned land outside a concession, the management arrangements in implementing the partnership scheme have also changed (Table 5-3). The company's main responsibilities are to provide the establishment capital, such as building the necessary road infrastructure, taking care of permits for land preparation and clearing, and undertaking operational planting and maintenance, which includes paying the labour costs, security and related taxes imposed by MoF regulations (WKS, 2008). There has been no differentiation in terms of the regulations imposed by the MoF on plantations established on community lands compared to those that apply to developing plantations within concession areas. Under the current arrangements implemented by WKS, community partners can include individuals, community groups, tree-grower groups, cooperatives or *BUMDES (Badan Usaha Milik Desa)* or village-owned enterprise. In the partnership scheme, the company sees the communities' main responsibilities to be securing the land and plantations legally, securing company access to this land, and preventing encroachment and illegal logging in the plantations that are established (Nawir *et al.*, 2003b; FI, 2008).

The main motivation mentioned by cooperative and individual community members for joining the partnership contract offered by the company was that they wanted to utilise the unproductive or idle land but lacked the financial capital and labour resources to do so (mentioned by 40% of interviewed community partners[19]) (Fieldwork in Jambi, 2009). The other important reasons were interest in incentives provided by the company (24%), and following friends' recommendations and the expectation of having employment opportunities (18%). The fact that a company recognised local community land ownership status seemed to be the least important, and was mentioned by the remaining respondents.

[19] A total of 45 community members were interviewed (Fieldwork in Jambi, 2009). See Appendix 3-1 for total numbers of community members interviewed.

Table 5-3. The management arrangements under the WKS Scheme

Management arrangements	WKS Scheme
Main focus	Establishing plantations on community privately owned areas
Land allocations of programmes on partnership areas [a]	80–90% of the area for acacia plantations, and the remaining 10–20 % can be used for local rubber (although no incentives for rubber seedlings are provided)
Term of contract	Six rotations (@ 4–5 years) based on contractual agreement between company and cooperative or tree grower group
Working plans	No specific working plans developed for the cooperatives
Incentives	Incentives for productivity ≥ 150 ton/ha (Rp 70,000/ha or AUD 8/ha) Allowances up to Rp 2,100,000 (AUD 256) per ha for six years until harvesting Social funds provided in response to communities' demands (e.g. for social cultural ceremonies)
Tree-growers representatives	*Koperasi Tani Hutan-KTH* (Forest Farmer Cooperative), although recently, the role of *KTH* has become limited
Conflict resolution mechanisms and sanctions against forest encroachment	Not clearly defined, depends on the rules set out in the *KTH*; these could vary between areas/tree grower groups/*KTHs*
Benefit-sharing agreement	Fees are paid to the community calculated based on the amount timber harvested (in tons) and vary based on distance and type of land (dry or peat lands)-(see Table 5-4)

Notes:

a. The crop composition (90:10) referred to in MoF Decree No. 70/Kpts-II/1995 on spatial allocation in developing Industrial Plantation Forest.

Source: Fieldwork in Jambi, 2009.

Under the current arrangements, a company guarantees the partnership for six rotations (each of about four to five years) or about 30 years, with the performance of the partnership implementation evaluated after every rotation (WKS, 2008). The period for the current partnership contract is shorter than the initial contract period initiated in the year 2000 for partnerships with a community claiming areas inside a concession, which was 43 years (Nawir *et al.*, 2003b). This recent partnership period of 30 years supports the changes in the maximum rotation period applied by the company, previously from seven to eight years to only four to five years for trees planted from 2007onwards (WKS, 2008). However, in practice, harvesting of the first rotation in most partnership scheme areas takes place from four to thirteen years (Fieldwork in Jambi, 2009). The reasons for this variation and delay compared to the planned rotation include the lack of an agreement between the cooperative and the company on the size of the area planted under the partnership, under-performance of contractors conducting the harvesting, and disagreement on the total weight of harvested timber (Fieldwork in Jambi, 2009). Contractors are the local community working group contracted by the company to do a particular job as part of the plantation development, such as land clearing, planting, or harvesting. These issues have created some tension between the head of the cooperative and its members, as well as with the company field staff, since all the cooperative members are very eager to take their share of revenue from the harvested timber (Field work in Jambi, 2009; Unja, 2007).

Under the previous partnership scheme initiated in the year 2000 between the company and the community claiming the areas inside the concessions, the benefit-sharing agreement proposed by the company was based on dividend payments according to shareholdings in the joint venture company set up to manage the plantations on a day-to-day basis (Nawir *et al.*, 2003b). The proposed distribution at the beginning of a 43-year contract was 80:20 with the company holding the larger proportion; this was planned to be reversed at the end of year 35 to 35:65 with the tree-grower cooperative holding the larger proportion (Nawir *et al.*, 2003b). However, the plan to form the joint venture company was abandoned due to the difficulty in gaining approval from the WKS company board of directors (WKS Board of director member, pers. comm., 27 May 2011). Therefore, for practical reasons, the company currently applies a benefit-sharing agreement based on a royalty system, which is paid according to the amount of timber harvested (in tons) and can vary based on distance and type of land (dry or peat lands) (Table 5-4). Royalties decrease with increasing distance between the plantations and the processing mill. The distance from the mill has become one of the important external factors due to the scattered locations of community partners' lands. Further analysis of the feasibility and profitability according to distance affecting timber transportation costs is included in Section 5.5.1.2.

The new royalty system is also applied to the partnership contract initiated earlier between the company and the community claiming the land inside concessions, despite different partnership contractual conditions based on shareholding proportion, as mentioned earlier in this section. The lowest royalty fees are applied; the updated contractual agreement specified fees of only Rp 10,000/ton (AUD 1.19), as included in Table 5-4 (Head of Cooperative 2, pers. comm., 9 January 2009). This has caused some tension between the cooperative and the company; however, the head of the cooperative has realised that no alternative investment is available, considering the status of its land located inside state forests. Moreover, the community partners are also not happy with the abandonment of the company's plan promising assistance to develop agribusiness-based enterprises aiming to generate income before the timber is harvested, at the end of the rotation (Nawir *et al.*, 2003b, Head of Cooperative 2, pers. comm., 9 January 2009). One of the reasons why the company terminated this assistance was because of the high investment cost of setting up the agribusiness enterprises with no clear market for the products; so, for the current partnership arrangements, the company focuses only on timber planting (WKS, 2008). Therefore, this community's perception is that the company should adjust the royalty payment to be at least similar to the royalty fees for the closest distance (0–100 km), since the community's lands are inside concessions. This is not a serious problem now; however, these grievances could become a source of future conflict.

Table 5-4. Fees applied to timber harvested from partnership areas in WKS

Program 96-06	Program in 2007			Program in 2008		
	Distance (Km)	Fees (Rp/ton)		Distance (Km)	Fees (Rp/ton)	
		Dry land	Peat land		Dry land	Peat land
Similar fees applied: Rp 20,000/ ton (AUD 2.37/ton)	0-100	50,000 (AUD 5,93)	30,000 (AUD 3.56)	0-100	70,000 (AUD 8.30	50,000 (AUD 5.93)
	101-150	40,000 (AUD 4.74)	20,000 (AUD 2.37)	101-150	60,000 (AUD 7.12)	40,000 (AUD 4.74)
	> 150	30,000 (AUD 3.56)	15,000 (AUD 1.78)	> 150	50,000 (AUD 5.93)	30,000 (AUD 3.56)
				Inside concession	10,000 (AUD	
Harvested in 7-8 years	Harvested in 4-5 years					

Sources: Adapted from WKS (2008)and Fieldwork in Jambi, 2009.

As part of the new incentive package and to attract the interest of prospective community members, the company has introduced a loan scheme known as the livelihoods support scheme. This scheme can be applied closer to harvesting time, under which the landowner can apply for a loan of Rp 30,000 (AUD 3.60) per ha per month up to a maximum value of Rp 2,160,000/ha or AUD 256 for a duration of up to six years, and the total amount will be deducted from the total value of the timber harvest (Unja, 2007; WKS, 2008). A request for a loan will be considered for approval after planting takes place, and where growth performance is assessed to be good according to an evaluation made up to six months after planting. To encourage more participation by the community partners, the company also provides a bonus of Rp 70,000 (AUD 8.41) per extra ton for productivity of above 150 ton per ha, which is the average production from a company plantation area.

The company has the expectation that this incentive package will maintain the tree growers' long-term commitment to the partnership contract. However, in 2009, the proportion of tree-grower households interviewed who continued to the second rotation was only about 26% of those who participated initially. The main reason given was that the revenues from the first harvesting (about Rp 2-3 million/ha or AUD 237–356) were considered to be too low over the period of six to nine years, compared to oil palm *(sawit)* and rubber *(karet)* (Fieldwork in Jambi, 2009). For example, oil palm plantations could return a similar amount of income per month when the international price was very good. Other reasons given by respondents included: time gaps between harvesting time and actual payments, which created mistrust between the head and the members of the cooperatives; some discrepancies between the total harvested tons and growers' expectations of productivity; and the non-continuation of agribusiness programmes, even before the global economic crisis in late 2008/early 2009 (Head of Cooperative 2, pers. comm., 9 January 2009).

5.4. Community-company partnership schemes in West Kalimantan initiated by FI (Finnantara Intiga)[20]

The partnership scheme implemented by FI is classified as Type 1 as discussed in Section 5.2.3, since it is developed by involving community members who claim the land inside concessions. Since Global Forest-GF (Sinar Mas Forestry-SFM) took over the company in 2004 from Stora Enso, the main reason why the current management of Finnantara Intiga (FI) chose to develop the partnership scheme was that they had

[20] See Section 3.4.2 (Chapter 3) and Appendix 5-2 for information on company profile.

inherited the plantation development arrangements that were in place under the integrated industrial plantation forest system (*HTI Terpadu*) (Nawir *et al.*, 2003b; Fikar, 2003; Roshykin, 2005). In 1995/1996, under the previous management of Stora Enso, FI did not develop their own plantation areas (*HTI-murni*), since most of the land inside its concession area was claimed as local community land, mainly due to this land being under shifting cultivation for many years (Nawir *et al.*, 2003b; Fikar, 2003). Therefore, initiating a partnership scheme with the local community has been the only approach that could be used to develop acacia plantations inside its concessions (Nawir *et al.*, 2003b).

The partnership scheme is based on contractual agreement either with the community as a group of cooperatives or farmer groups, or with individual land claimants (FI, 2006a; 2008). Under the current management, the partnership arrangements are increasingly based on individual contracts for one rotation (seven years) instead of 45 years as is the contract period for communal land (FI, 2008; Head of sub-village 1, pers. comm., 17 January 2009; Head of sub-village 2 and 3, pers. comm., 18 January 2009). Developing plantations under a partnership arrangement with local communities could, to some extent, be interpreted as an approach implemented by the company that has recognised the community's land rights inside the state forest concession area (Nawir *et al.*, 2003b).

The current FI management has continued to develop timber plantations under the partnership model with some changes, as discussed in Section 5.4.1 (Institutional arrangements) and Section 5.4.2 (Management foci and arrangements). With a focus on achieving a higher production target of acacia productivity per ha of 150 m^3/ha from these plantations (the company standard), SMF (Sinar Mas Forestry) as the current owner of FI simplified the processes of setting up the institutional arrangements, focussing on speeding up the land acquisition process (Fieldwork in Sanggau, 2009). Moreover, the current management took advantage of having a good foundation of social capital that resulted from the strong community-based approach implemented by the previous company, which used a participatory approach in the land acquisition processes (Nawir *et al.*, 2003b, Fieldwork in Sanggau, 2009).

Under the new management of SMF since 2004, FI has shifted its focus to boosting land acquisition to extend the planting areas. The company set a target of acquiring 20,000-30,000 ha per year for planting and the production target of 1 million/ton/year with higher productivity per ha (FI, 2008; Schneck, 2009, FI Company staff, pers. comm., 6 January 2009). Since SMF took over the company, FI has been able to secure an additional 46% of new planted areas (16,903 ha) with an average of more than 5,500 ha/year being planted in only three years (2005–2008)(FI, 2008). Furthermore, there has been a new planting for the second rotation of 8,505 ha, so the total current community plantation area is 45,497 ha (Schneck, 2008; FI, 2008). The 28,031 ha remaining from the first rotation is a combination either of land still in the harvesting stage or land under preparation for new planting, or of areas where the owners have not decided or do not want to continue to go to a second rotation, despite the initial 45-year contract (Fieldwork in Sanggau, 2009).

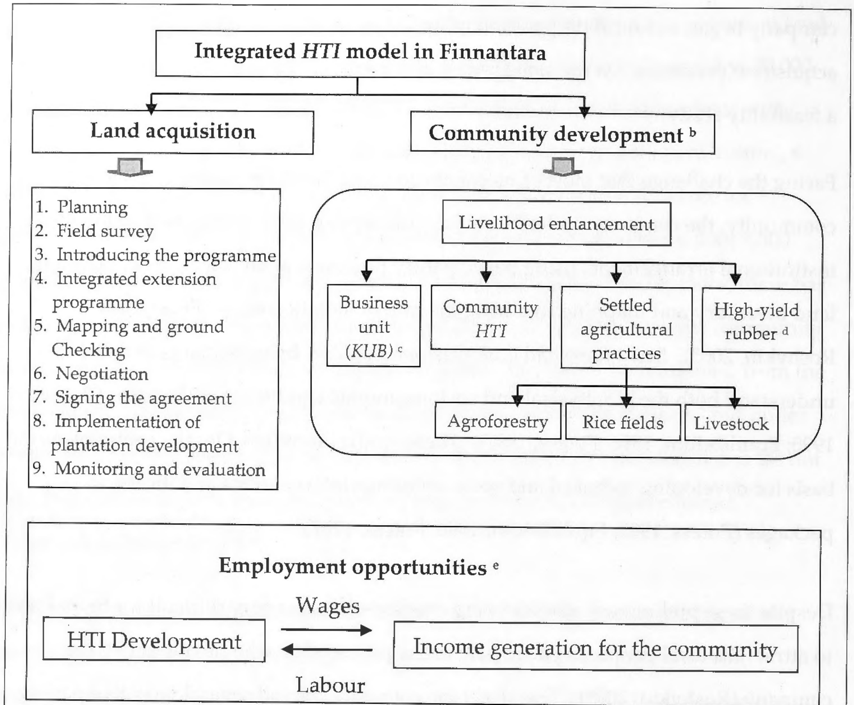
Under the previous management of Stora Enso, marketing the timber produced was the main problem faced by the company, since there was no clear contract with particular buyers to secure the market (Nawir and Santoso, 2005). This was mainly because Stora Enso had shifted its investment to China, and the plan to set up a pulp mill in nearby West Kalimantan Province was cancelled in 1998 (Nawir *et al.*, 2003b). When SMF bought this company from Stora Enso, it brought market security to the timber produced from the partnership scheme. This was eventually important in securing timber benefits that could potentially be received by the community partner. Currently, under SMF, timber produced from these areas is transported to its sister processing company in Riau, Sumatra (FI Company staff 2, pers. comm., 14 January 2009). Current production in West Kalimantan is 500–600 thousand tons per year; the company has no plan to develop its own mills until the target production of 1 million tons per year can be achieved (FI Company staff 1, pers. comm., 1 January 2009).

5.4.1. Institutional arrangements

Under the previous management, the institutional arrangements of the FI Scheme had been developed based on the integrated *HTI* development model (Figure 5-7). The two main components were the land acquisition process and the community development programmes (Nawir *et al.*, 2003b). After introducing the partnership programme the company began technical preparation followed by field orientation, as part of the land acquisition processes. At the same time it also conducted a socioeconomic survey and a feasibility study.

Facing the challenge that most of its concession area had been claimed by the local community, the company under Stora Enso ownership tried its best to develop the institutional arrangements using participatory processes at all stages, from planning, land inventory and mapping to during the implementation stage (Fikar, 2003; Roshykin, 2005). Stora Enso had commissioned studies by consultants in order to understand both the biophysical and socio-economic conditions of the areas (Potess, 1995; Equilibrium, 1996; Potess, 1997). These studies were used by the company as the basis for developing technical and socio-economic interventions and incentive packages (Potess, 1995; Equilibrium, 1996; Potess, 1997).

Despite these preliminary studies being conducted, it was very difficult for Stora Enso to attract the local people to participate in the partnership scheme offered by the company (Roshykin, 2005). Therefore, the company created several incentive packages as part of the community development programmes (see Section 5.4.2 for description of these incentive packages). It took about two years to finally interest the community in joining, and before trees could be planted (Fikar, 2003; Roshykin, 2005). In some villages, the company faced problems in convincing the people to join due to their bad experience under a joint ADB—Inhutani III reforestation project in Sanggau, which was endorsed by the government in the early 1990s (Nawir *et al.*, 2003b). The progress on land acquisition was very slow; up to 2004, the planted area was only 36,536 ha or about 4,000 to 4,500 ha/year (Nawir *et al.*, 2003b; Roshykin, 2005). However, this involved 7,500 households in 130 sub-villages from the total available 160 sub-villages (Roshykin, 2005).



File: Diagram integrated HTI

Notes:

a. Current management is adopting similar approaches.

b. Incentive packages are also developed as part of the community development (see Section 5.4.2).

c. Assistance on high-yield rubber seedlings: the only community development component that is adopted under current management.

d. KUB is no longer part of the current arrangements.

e. Employment opportunities as required by appropriate silvicultural practices.

Source: Adapted from FI (2008) and Nawir *et al.* (2003b).

Figure 5-7. Institutional arrangements developed by previous management and adopted partly by current management of FI

At the beginning of partnership arrangements in 1996, to stimulate community participation, FI developed income diversity options not directly related to the main activity of establishing acacia plantations, which aimed to fill the gaps between planting and harvesting the timber (discussed in Section 5.4.2). The current management has adopted the component of land acquisition processes established under the previous management. However, in relation to community development, the current management has adopted only the component of assistance for high-yield rubber seedlings. The incentive of providing rubber seedlings is also part of the company obligation as the *HTI* rights grantee to allocate 5% of its concession areas for developing crops to support local livelihoods (see Section 5.2.3.2). In 2009, despite the company's emphasis on providing rubber seedlings proportionally to the acacia-planted areas, the total rubber plantation accounted for only 4% (17,068 ha) of the total concession areas (Schneck, 2009). Employment opportunities were now provided only as required by silvicultural practices, in contrast to previous practices. The previous management had supported employment opportunities under a 'social weeding' programme; this additional weeding allowed under the Stora Enso policy was organised just to provide work, so communities had additional income, despite the fact that this was not really required for more than three years after planting (Nawir *et al.*, 2003b).

At the beginning of a partnership in 1996, the community partner participants were organised through the *KUB-Kelompok Usaha Bersama* or Community Business Group (CBG), which was also the means for carrying out various training programs in the field (Fikar, 2003). The company formed the *KUB* also with the objective that it would function as an organisation to manage and implement the five main components of community development (credit and savings, community plantation, permanent agriculture, short-term tree crops, and local species) (Fikar, 2003; Nawir *et al.*, 2003b; Roshykin, 2005). However, since this initiative began, its implementation has been hampered by the lack of ability of the participants to perform the functions of organisational partners (Tim DIMAS, 2000; Nawir *et al.*, 2003b). During the field observations, it was noticed that *KUB* was no longer a part of the institutional arrangements implemented by the new management of FI (Fieldwork in Sanggau, 2009).

Land acquisition and associated negotiation processes have taken up much of the company's financial and human resources. Moreover, the community development components through the incentive package have required a higher allocation of company resources than the company intended. As the results from the financial analysis presented later reflect, the institutional arrangements implemented by FI have affected the feasibility and profitability of the acacia plantation development under the partnerships scheme, making it less competitive (discussed further in Section 5.5).

Interviewed community members stated that a less participatory approach has been adopted by current FI management in negotiating the conditions as part of the land acquisition processes (Head of sub-village 1, pers. comm., 17 January 2009, Head of sub-village 2, pers. comm., 18 January 2009, and Head of sub-village 3, pers. comm., 18 January 2009). Due to the higher production target, field staff have been placed under more pressure to sign up for as much land as they can in a short time (Field work in Sanggau, 2009). Unrealistic promises, such as employment opportunities in the company, were used to persuade community members to allow their land to be included in the partnership scheme (Fieldwork in Sanggau, 2009). Such promises were often made without agreement from the company management, and they did not reflect company policy (FI Company staff 2, pers. comm., 20 January 2009).

Since the beginning, FI has strongly asserted that the forests belong to the state even though the community claims ownership. Ensuring the community clearly understands the terms of their tenure of the land inside the concessions in state forests has been emphasised by FI under current management. As a result, community members now understand more about the status of their land as part of the concession areas/state forests and why they cannot convert this land for other uses, e.g. oil palm plantation (Head of sub-village 2 and 3, pers. comm., 18 January 2009).

However, the current approach in initiating and implementing the partnership scheme, with pressures to achieve higher timber production targets, has been at the expense of gradually increasing grievances among community members, especially those who were not happy with the benefits from the first rotation harvest, as observed during the fieldwork (2009) (see Sections 5.5.4 on estimated benefits received at the household level). Further, since the company is now focussing on management efficiency, it has had to cut costs by eliminating some activities that were considered unnecessary, e.g. the social weeding mentioned earlier. The community's income was seriously affected by these changes, especially during the global economic crisis in later 2008/early 2009, when the crisis hit the rubber resin prices and oil palm prices dropped to their lowest level. In addition, as observed during fieldwork in early 2009, most communities were concerned about the certainty of company activities on the ground, especially after the company decided to layoff some 5,000 employees and closed the two district representative offices temporarily. There have also been some communication problems, for example in informing the community of internal management decisions, and not providing clear information to the surrounding local communities. These changes have led to the community questioning the continuation of the plantation activities.

5.4.2. Management foci and arrangements

To produce timber for commercial purposes, the main programme focussed on 95% of the partnership area used to develop acacia plantations, while the remaining 5% of the area is used for high-yielding rubber trees with financial assistance from the company for seedlings (Table 5-5). Allocation of land-use partnerships has not changed under the management of SMF. The company also included certain conditions as part of the contract offered to community partners, with the intention of securing its access to the land and ensuring its operational activities over the 45-year contract. These conditions mainly fall within the responsibilities of the landowners, such as ensuring that landowners will not claim back the land handed over or prevent the company from gaining access to the area (FI, 2006b). However, enforcing the security of company access has been very challenging to implement on the ground, mainly due to the pressures from the expansion of oil palm plantations and land ownership conflicts between Dayak groups (Head of sub-village 2 and 3, pers. comm., 18 January 2009).

Under the *HTI* integrated development model applied in Sanggau, besides having to provide for all the expenses in relation to timber plantation development as well as building up the infrastructure required, the company also has to create attractive incentive packages as part of the community development component (Table 5-5). The earlier incentive package established in 1996 was part of the company's efforts to provide incomes to fill the gap between planting and harvesting, due to the limited local livelihood alternatives. As in the case of WKS, these have become an important part of partnership arrangements for attracting community members to join the scheme, but also for maintaining the commitment of community partners to continue to the second rotation.

Being attracted by company incentives was mentioned by 29% of community participants interviewed among Dayak communities and a small number of migrant families (Javanese and Sundanese) as the main motivation for joining the partnership scheme. Following friends' recommendations was the next most often mentioned, by 27% of respondents. Other reasons included employment opportunities with the company, given the lack of financial and labour capital to manage the land productively since there were limited economic opportunities existing in the area because the location is quite remote and there is limited transportation available.

However, in line with the current management efforts and the company objective to increase the timber production, some incentives were eliminated from the previous partnership arrangements for efficiency reasons by reducing the operational costs. This decision by the company is considered to be very realistic from a financial point-of-view compared to the initial incentive packages developed under Stora Enso, through which the previous community development programmes had rendered the whole management scheme financially unfeasible (Nawir *et al.*, 2003b).

Table 5-5. **Comparison of previous and current partnership arrangement in Finnantara Intiga**

Management arrangement	Previous arrangements	Current arrangements
1. Land allocation	a. 95% of the area for acacia plantations (10% of this area was used for planting native species) b. 5% of the area was used for high yielding rubber trees with the assistance from the company on seedlings)	a. Similar allocated proportions: 95% for acacia (10% is allocated for communal land i.e. *tembawang*) b. Similar proportion for high yielding rubber trees, assistance in cash provided to buy seedlings
2. Term of contract	45 years	45 years for communal land and one rotation (7 years) for individual land
3. Incentives	a. Land incentives: Rp 40,000 (AUD 5) per ha of acacia planted b. Funds for infrastructure development: Rp 20,000 (AUD 2) per ha of acacia planted c. High-yield rubber seedlings d. Incentives for conducting a traditional ceremony prior to land clearing: Rp 500,000 (AUD 59) per sub-village e. Agroforestry programme: establishing dry paddy fields on five ha per sub-village (*kampung*) in plantation areas in the form of credit assistance f. Rice paddy intensification programme: assistance to establish two hectares per sub-village g. Credit and savings programme managed by *KUB*	a. New land incentive: Rp 10,000 (AUD 1.2) per ha of acacia planted b. Funds for infrastructure development: Rp 50,000 (AUD 6) per ha of acacia planted c. Cash provided to buy rubber seedlings: Rp 500,000 (AUD 59) per ha of acacia planted after the contract is signed. d. Increase Rp 1,500,000 (AUD 178) for one sub-village e. No longer exists f. No longer exists g. No longer exists
4. Tree-growers' representatives	*KUB-Kelompok Usaha Bersama* or Community Business Group (CBG)	*KUB* no longer active. The heads of villages and/or sub-villages play an important role in some areas
5. Conflict resolution mechanism and sanctions	Customary institution to solve conflicts internally among community members, and the head of cooperative or *KUB* representing community in communicating any matters to company	Customary institution is still dominant. The head of villages and sub-villages represents community in communicating any matters to company
6. Benefit-sharing agreement	Revenues shared based on volume of acacia wood harvested. Value based on minimum royalty per m^3 with a proportion of 10% from the total harvested volume for community partners. Guaranteed minimum royalty was Rp 7,500 (less than AUD 1) per m^3	Similar proportion of 10% community share of timber benefits; the new royalty fee is Rp 15,000 (AUD 2) per m^3. The Rp 500,000 (AUD 59) of royalty per ha of acacia planted is paid up-front.

Sources: Adapted from Nawir *et al.* (2003b); Roshykin (2005); and Fieldwork in Sanggau, 13-19 January 2009.

Major differences in the incentive packages are: replacing direct assistance with rubber seedlings with cash to purchase seedlings; reducing the land incentive (i.e., compensation paid in recognition of the value of the land handed over in the partnership); increasing the funds for infrastructure development and the assistance for conducting a traditional ceremony prior to land clearing. Incentives were also eliminated, namely agro-forestry and paddy-field intensification programmes, and also the credit and savings programme managed by KUB. The partnership programme has not relied on *KUB* to represent the community partners because it is no longer in existence. Coordination of activities in the field has been mostly done through the head of the village, and especially the head of the sub-village (Head of sub-village 2 and 3, pers. comm., 18 January 2009).

Most of the incentives are granted in line with the proportion of acacia actually planted and provided after the contract is signed, so that the acacia plantation can be developed. For example, company assistance in providing high-yield rubber seedlings is Rp 500,000 (AUD 59) per ha of acacia planted after the contract is signed. Field observation indicated that community partners have not generally used the money to buy high-yield rubber seedlings, but instead allocated the money for their everyday household needs. If the community needs rubber seedlings, it is more practical to collect these seedlings from their own plantations around the villages (Head of sub-village 2 and 3, pers. comm., 18 January 2009).

Following the current management focus to improve productivity, there has been an increasing yield per ha per year during the management by SMF compared to the previous management, from 15-20 m^3/ha/year to an average of 25 m^3/ha/year (Schneck, 2008). The low productivity per ha during the previous management under Stora Enso was mainly because that company focused more on the land acquisition processes, and so most of the plantation development activities were less intensive (Nawir *et al.*, 2003b). This was partly because the activities were usually conducted by community members who had less experience with the programmes providing employment opportunities to their local communities, and partly because of the imbalance between the provision of 'generous incentives' and the setting of commercial objectives to ensure feasible and profitable timber plantation management (Nawir *et al.*, 2003b). The implications of productivity per ha to the feasibility and profitability of the partnership scheme is discussed further in Section 5.5.1.1.

5.5. Economic perspectives of community-company partnership schemes, and factors influencing their feasibility

HTI companies face more challenges in developing plantations by involving communities under contractual arrangements, particularly in cases where a partnership scheme is initiated as part of the conflict resolution mechanism with the local communities over concession areas. Furthermore, there are more challenges that arise from the community maintaining its common, long-held perception of the low competitiveness of investment in acacia plantations developed under partnership, in comparison to alternative land uses. However, as further discussed in this section, there is some cognisance that acacia can actually have relative economic advantages in providing benefits to local communities.

The financial analysis in this section compares the partnership schemes implemented by WKS and FI at the two case-study sites. This analysis examines the financial profitability and feasibility of the current management in both areas, and its potential impacts on the livelihoods of local communities. It also draws comparisons with other investment alternatives, particularly smallholder oil palm and rubber plantations. The comparison is based on a CBA (Cost Benefit Analysis) as discussed in Section 3.3.3 of Chapter 3; this method is used to analyse the implications of the relevant policy and regulatory framework in implementing acacia plantations under the partnership schemes, as well as the characteristics of tenurial, institutional and management arrangements discussed in earlier sections (Section 5.2, 5.3 and 5.4), which affect the scheme's economic feasibility and profitability.

The overall economic feasibility and profitability of current partnership schemes are characterised by the institutional and management arrangements initiated by the company in developing the schemes. Important characteristics of the schemes include the period of partnership contract, up to 30 years for the WKS Scheme and 39 years for the FI Scheme.[21] However, there is a tendency for the companies to initiate a one rotation-based partnership contract, mainly with individual landowners, and to implement the long-term contract only for communal land owned by tree-grower groups. Therefore, the financial analysis was conducted on both the total contract partnership period and on one rotation. Analysis was also conducted on two different levels of acacia productivity (company standard and current acacia productivity), since the feasibility and profitability of the acacia plantations under the partnership scheme is sensitive to productivity per ha (Section 5.5.1.1). The company standard of acacia productivity is used by the two companies in their planning and in estimating standard plantation costs. Section 5.5.1.2 and 5.5.1.3 discuss the results from financial analysis on the feasibility of the acacia plantations under the partnership scheme in response to external conditions.

Further, the second section focuses the cost components affecting the economic feasibility and profitability (Section 5.5.2) that are used to discuss the policy framework and the institutional and management arrangements that affect the nature of these components. The risks of not maintaining community interest in the long-term feasibility and profitability are reviewed (Section 5.5.3). As further discussed in Section 5.5.4 on potential impacts on livelihoods, the financial benefits transferred to the community through the benefit-sharing agreement under the partnership arrangements are assessed.

5.5.1. Feasibility and profitability of community-company partnership schemes initiated by FI and WKS

In this section, the discussion focuses on the feasibility and profitability under three conditions: with the current productivity level in comparison to company standard productivity for both the total contract period and one rotation scenarios; in response to how the scattered locations of community land affect the transportation costs; and the scenario of increasing wood prices.

[21] For WKS, total period is based on the current arrangement, to cover six rotations. For FI, total period is estimated based on the remaining partnership contract period since it was initiated in 1996; currently, the company is shifting to implement one rotation-based partnership contracts (see Appendix 5-3 for detailed discussion on the assumptions for Cost and Benefit Analysis (CBA).

5.5.1.1. Feasibility and profitability under current conditions

The benefits under the WKS Scheme come only from timber harvested, since the scheme does not include the incentives for developing other commodities. For the overall contract period of 30 years, the analysis of the partnership scheme implemented by WKS using current acacia productivity indicates net negative benefits, for example the benefit per ha is derived at Rp 7 million or AUD 806 (Table 5-6). The scheme becomes feasible at the company's standard acacia productivity level, with an overall benefit of Rp 41 million (AUD 4,910). Although the IRR value indicates this is a feasible investment alternative, since it is more than the discount rate used (8%), the NBIR value is about one, which does not represent a net benefit of return on investment (Table 5-6).

FI has increasingly shifted towards implementing a partnership contract based on one rotation of acacia (seven years). However, the analysis for one rotation indicates that it is not a feasible or profitable option under the current level of acacia productivity. It has a negative net benefit per ha at Rp 1 million (AUD 171), an IRR value of only 4%, which is below the discount rate of 8%, and an NBIR of less than two. This indicates that the rotation of seven years is not profitable for single-rotation management under the current operating scheme at FI due to the high start-up costs required, as discussed further in Section 5.5.1. Research conducted by Krisnawati (2007) demonstrates that the optimal rotation age for pulpwood production is seven to eight years. After the optimal rotation age, keeping the acacia un-harvested does not give additional economic value, even though no costs are involved.

Table 5-6. **Feasibility of the community-company partnership schemes in FI and WKS** [a]

Management scenario and assessment criteria	Community-company partnership schemes					
	FI [b]				WKS [c]	
	Timber and rubber		Timber only			
	Rp	AUD	Rp (million)	AUD	Rp (million)	AUD
A. Total period of partnership contract analysis [e]						
a. Using company standard of acacia productivity [f]						
1. Net benefits						
a. Value for the overall	7,077	839,361	1,622	192,304	41	4,910
b. Value per ha	19	2,262	4	518	0.18	21
2. IRR	20%		21%		9%	
3. NBIR	4.58		1.70		1.03	
b. Using current acacia productivity [g]						
1. Net benefits						
a. Value for the overall	4,838	573,730	1,136	134,671	(1,556)	(184,575)
b. Value per ha	13	1,546	3	363	(7)	(806)
2. IRR	16%		13%		-0.24%	
3. NBIR	3.45		0.57		(0.03)	
B. One rotation analysis [e]						
a. Using company standard of acacia productivity [f]						
1. Net benefits						
a. Value for the overall	543	64,341	1,622	192,304	1,427	169,212
b. Value per ha	1	173	4	518	6.23	739
2. IRR	11%		21%		25%	
3. NBIR	3.72		1.70		7.80	
b. Using current acacia productivity [g]						
1. Net benefits						
a. Value for the overall	(535)	(63,454)	546	64,725	531	63,029
b. Value per ha	(1)	(171)	1	174	2	275
2. IRR	4%		13%		15%	
3. NBIR	1.96		0.57		3.53	

File: Compilation Jambi & Sanggau 220611.xls - NPV (2)

Notes:

( ): Negative values

a. Base scenario using price for acacia timber at USD 20/ton; financial net benefit is estimated based on NPV (Net Present Value) of CBA using 8% discount rate (see Section 3.3.3, Chapter 3). Estimation is for management within 0-50 km distance from mill (WKS) and from port (FI). Total area of WKS Scheme is 229 ha and of FI Scheme is 250 ha (the average plantation area managed in block under partnership). See Appendix 5-4.1 and 5-4.2 for information on the cash flow.

b. FI Scheme includes incentive for rubber seedlings (see Section 5.4), so revenue includes yield from rubber plantations.

c. WKS Scheme only focuses on acacia planting, since no other incentive is provided by the company.

d. The total period of the partnership contract with FI is 39 years and 30 years with WKS. One rotation refers to seven years in FI and five years in WKS.

e. Company standard productivity refers to 150 m^3/ha and period of contract is five rotations with FI and six rotations with WKS. Current productivity is based on harvested volume by respondents in the survey, i.e. by FI it is 106 m^3/ha and by WKS it is 107 m^3/ha.

Sources: Analysed from data collected during revisited survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009).

The benefits under the FI Scheme come from both timber and rubber, since the scheme includes an incentive package for developing both. For the overall contract period of 39 years, even using current acacia productivity, the analysis of the partnership scheme implemented by FI indicates positive net benefits. The proportion of benefits is 77% from rubber and 23% from timber (Table 5-7). The net benefit at the current acacia productivity level per ha is Rp 13 million or AUD 1,546, with an IRR of 16% and an NBIR of 3.45. The return at the company standard for acacia productivity provides a benefit 1.5 times greater per ha, at Rp 19 million (AUD 2,262). However, the IRR value at this productivity level is much higher, at 20%, which could be even higher as an expensive investment alternative. However, with a higher ratio of net return to every money value invested at an NBIR of 3.45, the benefit indicated is three times greater for every dollar spent, so the net benefits potentially outweigh the costs. A separate analysis of timber management indicates a similar trend; however, the NBIR is much lower. This implies that focussing on timber plantation development only would require some areas of improvement in order to make the operation more cost-effective (see Section 5.5.1.2 for further discussion).

Table 5-7. Proportion of benefits from timber and rubber under FI Scheme [a]

Sources of benefits	Using company productivity [b] Value of the benefits			Using current acacia productivity [c] Value of the benefits		
	Rp	AUD	%	Rp	AUD	%
1. Timber						
a. Value for the overall areas	3,706	439,508	52%	1,132	134,222	23%
b. Value per ha	6	662		5	537	
2. Rubber						
a. Value for the overall areas	3,372	399,853	48%	3,706	439,508	77%
b. Value per ha	13	1,599		9	1,009	
Total						
a. Value for the overall areas	7,077	839,361	100%	4,838	573,730	100%
b. Value per ha	19	2,262		13	1,546	

File: Compilation Jambi & Sanggau 220611.xls - NPV timber & rubber FI

Notes:

a. Estimated based on NPV.

b. Company standard productivity refers to 150 m³/ha.

c. Current productivity is 106 m³ha.

Sources: Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009).

As explained in Section 5.3, the current management at FI (SMF) has been trying to improve productivity of its partnership plantations since taking over the company. These results suggest that, until the company is able to do this, it is better for the company to arrange long-term contracts for partnerships in order to secure its timber supply. As observed from the analysis and admitted by company staff, five years after SMF took over the company from the previous owner, FI is now just above the break-even point and has started making profits from its operational activities (FI Company staff 1, pers. comm., 6 January 2009, Schneck, 2009).

On the other hand, WKS applies a shorter rotation for acacia (five years) to meet the timber demand by its sister processing company. So, the single-rotation analysis indicates positive benefits per ha (Rp million or AUD 275), and profitable indicators of IRR (15%) and NBIR (3.53) under current acacia productivity. The benefits are even higher using the company standard of acacia productivity at Rp 6 million (AUD 739) per ha with IRR at 25% and NBIR at 7.80.

Under both WKS and FI Schemes, the survey indicated that in practice there is a two-year gap between the initial agreed rotation covered under the partnership agreement and the actual rotation implemented. This has caused a delay in harvesting beyond the standard rotation agreed initially. In the community's plots under the FI Scheme, the average rotation was nine years, and in those under the WKS Scheme the average rotation was seven years (Fieldwork in Jambi and Sanggau, 2009). Under the FI Scheme, the main reason for the delay was the period required for the management changes to be put in place, from the former to the current company owner (FI Company staff 1, pers. comm., 6 January 2009, FI Company staff 4, pers. comm., 2009). In WKS areas, the delay occurred due to difficulties in accessing the community's plantation areas: neither the community nor the company could agree on the boundaries of the harvesting areas, and the company was questioning the accuracy of names on the list of cooperative members (WKS Company staff 2, pers. comm., 9 January 2009). Deciding which contractor should do the harvesting was also one cause of the delayed harvesting. In this case, 'contractor' refers to the work team contracted by the company, which usually consisted of several local people as labourers to do particular tasks as part of the plantation development.

The delay in harvesting caused the community to lose its benefits; this was indicated by the opportunity costs of the land if it had been used for other crops, mainly under competitive land uses, namely rubber and oil palm plantations (see Box 6-5 in Chapter 6 for further discussion of estimated annual benefits for other land-use alternatives). The delay in harvesting did not result in significant differences in terms of its benefits, since the incremental annual growth in acacia after year seven is very small due to the optimum growth level being reached in year seven to eight (Krisnawati *et al.*, 2011; World Agroforestry Centre and PROSEA, Undated).

5.5.1.2. Feasibility and profitability in response to external conditions: scattered locations of community partners' land

The earlier analysis discussed in this section was based on the assumption of the community partner's plantation being within 0–50 km of the processing plants (in the case of WKS), or the port (in the case of FI). Analysis of a further two scenarios, with distances of 50 to 100 km and more than 100 km, was conducted to assess the feasibility and profitability of planting timber on community lands within these two distances at current productivity (Table 5-8). Under the FI Scheme, the management of the partnership scheme becomes unfeasible for areas located at a distance of more than 100 km both for the total period of the partnership contract and for the single-rotation period. The NPV values per ha are negative: Rp 460 thousand (AUD 54) and Rp 22 thousand (AUD 27), respectively. The total harvested volume at current productivity could not pay off the transportation costs.

Under the WKS Scheme, the management scenario for the total period of the partnership contract also shows management options are not feasible, for both distances (50–100 km and more than 100 km). At current timber productivity (the base scenario, within 50 km), the additional transportation costs would not be covered. For both FI and WKS, at current productivity, the location at distances of more than 50 km renders them unfeasible due to transportation costs.

Table 5-8. Feasibility and profitability of community and company partnership schemes in FI and WKS defining the transportation costs in two distance scenarios [a]

Assessment indicators	Community-company partnership schemes			
	FI		WKS	
	Rp (million)	AUD	Rp (million)	AUD
a. Total period of partnership contract using current acacia productivity per ha [b]				
A. Distance 50 - 100 km [c]				
1. NPV				
a. Value for the overall areas	309	36,696	(1,594)	(189,087)
b. Value per ha	1	99	(7)	(826)
2. IRR	10%		Negative	
3. NBIR	1.16		(0.05)	
B. Distance: more than 100 km [c]				
1. NPV				
a. Value for the overall areas	(170)	(20,121)	(2,143)	(254,196)
b. Value per ha	(0.46)	(54)	(9)	(1,110)
2. IRR	7%		Negative	
3. NBIR	0.91		(0.42)	
b. One rotation using current acacia productivity per ha [b]				
A. Distance 50 - 100 km [c]				
1. NPV				
a. Value for the overall areas	148	17,510	514	60,993
b. Value per ha	0.40	47	2	266
2. IRR	10%		15%	
3. NBIR	1.16		3.45	
B. Distance: more than 100 km [c]				
1. NPV				
a. Value for the overall areas	(83)	(9,871)	360	42,712
b. Value per ha	(0.22)	(27)	2	186
2. IRR	7%		13%	
3. NBIR	0.91		2.72	

File: Compilation transportation.xls - NPV Transportation (2)

Notes:

( ): Negative values

a. The distance affecting the transportation costs; transportation cost standard is explained in the Appendix 5-3.

b. Analysis was conducted on current acacia productivity.

c. Total period of partnership contract is 39 years (FI) and 30 years (WKS); one rotation is seven years (FI) and five years (WKS).

Sources: Analysed from data collected during survey in Jambi and Sanggau (4-21 January, 2009).

5.5.1.3. Feasibility and profitability in response to external factors: increasing acacia prices

The overall feasibility of timber management under the partnership scheme is greatly affected by the level of prices received by the company for its harvested acacia. Due to the increasing demand for raw materials to supply the processing industry, mainly pulp and paper, acacia prices follow the increasing trends of pulp and paper as the main products in the international market (Barr, 2001; Jurgens *et al.*, 2005; Jurgens, 2008; Ince *et al.*, 2011). However, the international prices of the final products are greatly affected by global conditions, such as the global financial crisis of 2008–2009 (FI Company staff 1, pers. comm., 11 January 2009). The prices managed to recover to a stable level by late 2010 and remained high in early 2011 (Ince *et al.*, 2011). Therefore, while the analysis is based on the price current when the study was conducted in 2009, USD 20 per ton, two estimated higher future price levels are used in analysing the feasibility and profitability of the partnership schemes: USD 36 and USD 46 (Jurgens *et al*, 2005 and Jurgens, 2008).

Under the FI Scheme, the management scenarios for current acacia productivity, both for the total period of the partnership contract and for one rotation of acacia, are feasible at the two levels of acacia prices, USD 36 and USD 46 (Table 5-9). The net benefits over the total contract period scenario provide net benefits per ha of Rp 7 million (AUD 869) at the acacia price of USD 36/ton, which is more than double the net benefits in the base scenario using USD 20/ton. At USD 36/ton, the management provides a lower IRR at 19% and an NBIR value about three times higher at 3.29. The analysis using the acacia price of USD 46/ton provides higher benefits, and shows similar trends.

Table 5-9. **Feasibility and profitability of community and company partnership schemes in FI and WKS in two scenarios of higher-level prices [a]**

a. Total period of partnership contract using current acacia productivity per ha [b]				
Assessment indicators	**Community-company partnership schemes**			
	FI		**WKS**	
	Rp (million)	**AUD**	**Rp (million)**	**AUD**
A. Level of price USD 36/ton [c]				
1. NPV				
a. Value for the overall areas	2,720	322,533	(788)	(93,499)
b. Value per ha	7	869	(3)	(408)
2. IRR	19%		4%	
3. NBIR	1.38		0.48	
B. Level of price USD 46/ton [c]				
1. NPV				
a. Value for the overall areas	4,825	572,171	1,302	154,444
b. Value per ha	13	1,542	6	674
2. IRR	25%		13%	
3. NBIR	2.44		1.86	
b. One rotation using current acacia productivity per ha [b]				
Assessment indicators	**Community-company partnership schemes**			
	FI		**WKS**	
	Rp (million)	**AUD**	**Rp (million)**	**AUD**
A. Level of price USD 36/ton [c]				
1. NPV				
a. Value for the overall areas	1,309	155,258	979	116,125
b. Value per ha	5	621	4	507
2. IRR	19%		20%	
3. NBIR	3.29		5.66	
B. Level of price USD 46/ton [c]				
1. NPV				
a. Value for the overall areas	2,324	275,562	2,074	245,996
b. Value per ha	9	1,102	9	1,074
2. IRR	25%		30%	
3. NBIR	4.89		10.88	

File: Compilation prices.xls - NPV Prices (2)

Notes:

( ): Negative values

a. Focussing on timber management only (with no rubber) at level of current acacia productivity: two price scenarios following Jurgens *et al* (2005) and Jurgens (2008) and with distance affecting transportation costs. Transportation cost standard is explained in Appendix 5-3. The FoB price in USD is the standard price used by the company in their planning and financial calculations.

b. Analysis was conducted on current acacia productivity.

c. Total period of partnership contract is 39 years (FI) and 30 years (WKS); one rotation is seven years (FI) and five years (WKS).

Sources: Analysed from data collected during survey in Jambi and Sanggau (4-21 January, 2009).

Under the WKS Scheme at the current level of productivity, the management scenario for the total period of contract partnership is not feasible at a price level of USD 36. The net benefits per ha are negative at Rp 3 million (AUD 408), with a much lower IRR at 4% (below the discount rate) compared to the base case scenario of USD 20 per ton of acacia at 13%. An IRR lower than the discount rate indicates that the management option is not feasible; this is also supported by the value of the NBIR, which is below one. However, the management option for one rotation using a similar USD price level indicates positive benefits per ha at Rp 4 million (AUD 507). Management scenarios using the higher price level of USD 46 indicates the option is feasible for both the total period of the partnership contract and one rotation.

In addition to the direct benefits from acacia development under partnership schemes accruing to community partners and the company, there are direct and indirect benefits resulting from related activities (supporting activities) conducted by the different parties. There are also benefits coming from the payment of the PSDH to the central government (i.e. Ministry of Forestry), which will eventually be allocated to provincial and district governments.

Directly, there are revenues (formal and informal) to the local governments (provincial, district and sub-district governments), mainly for their services in administering the required documents, such as the RKT (annual working/harvesting plans), and the documents for transporting and harvesting timber beyond concession areas (ComForLink, 2005). District and sub-district governments play several roles in ratifying/signing the partnership contractual agreement between company and community partner (represented by a cooperative). Sub-district and village-level governments also play a role by providing their services as part of the process of verifying the legal status of land papers for prospective community partners interested in joining the partnership scheme (see Section 5.2.3.2 on the processes required to be completed by the company).

Free-riders also gain benefits from the development of partnership schemes for acacia plantations; timber-related business activities have always attracted free-riders operating informally. For example, during harvesting there are parties who come to the area asking money for their services in securing the timber harvesting activities (WKS Contractor 1, pers. comm., 11 January 2009).

As discussed in Section 5.5.3, in the process of developing acacia plantations it is important to include the roles of contractors as part of the operational activities in plantation development. There are different types of contractors based on operational scales. In FI areas, contractors mainly comprise a team drawn from the local communities in the surrounding partnership/concession areas. Contractors involved with WKS operations are mostly companies who have long-term experience in managing timber plantation operations. However, often these contractor companies hire local community members for their field teams and so provide employment benefits to the community (see Box 5-2 for further discussion on their main roles and the reasons companies deal with contractors).

Box 5-2. Roles of contractors in bridging the gap between the company and community as part of the partnership schemes

There are five main roles performed by contractors and reasons companies deal with contractors:

First, contracting provides employment opportunities for local people who are landless, particularly in Sanggau, West Kalimantan, where the livelihood opportunities are limited. This is especially true under difficult economic conditions, such as the global economic crisis that occurred at the end of 2008/early 2009. Different contractor teams specialise in different operations, such as land clearing and land preparation, planting, harvesting, loading and transportation.

Second, the contractors play a prominent role in covering the costs of advance payment for workers who are hired before the company pays the contractors for the work done. This is mainly because most of the jobs require a long stay in remote locations, and before the team members can go with the contractor team, they have to provide their families with enough money for their subsistence. Even when one job is finished, the contractor who organised the workers has to pay the workers, before the company pays, based on the contracted agreement. However, in the case of FI, increasing bureaucratic payment procedures under the new management have created a delay between the time when the job is finished and when payment is made. Some contractors have stopped working for the company for this reason. The company runs a greater risk of losing experienced contractor teams, which can result in delays in different plantation development activities and a higher timber waste during harvesting.

Third, the transaction costs can be reduced because these contractors deal directly with the local villagers individually. Often, the contractors also transfer knowledge about different plantation activities to the local people who are in the work teams through informal training in the field.

Fourth, it is an alternative for reducing company investment costs for heavy machinery for land clearing. This is particularly true if the contractor, such as in Jambi, has the equipment and experience in land clearing and preparation, as well as harvesting. However, there are only a few contractors that have both the equipment and experience. They usually have a long-term working relationship with a company. Therefore, it is difficult for new contractors to obtain a job contract as most companies prefer to use contractors they have appointed themselves. One example was the case of an unfinished harvesting job in one of the case study sites as part of the WKS Scheme, since the community and company could not agree upon which contractor to hire. This issue arose due to the high amount of timber waste resulting from the first block harvested (Head of Cooperative 2, pers. comm., 9 January 2009).

Fifth, hiring a contractor can improve the productivity and reduce timber waste during harvesting. This is partly because managing timber plantations such as acacia require intensive management. This provides sufficient time for the local people to acquire skills in different silvicultural practices in the timber plantations and to achieve optimum productivity. This is crucial not only for the company, but also for the community partners, since the amount of the final shared benefits from the timber is sensitive to the productivity and total volume of timber harvested. It is important that companies maintain good working relations with the contractors.

Sources: Survey in Jambi (2009) and Sanggau (2009).

5.5.2. Cost component characteristics affecting the economic feasibility and profitability of community-company partnership schemes initiated by FI and WKS

Developing acacia plantations under partnership schemes is more complicated than the business-as-usual mode of developing plantations under the *HTI* scheme, in which the company manages its own plantation. Different cost proportions under partnership schemes implemented by FI and WKS reflect the differences in the nature of institutional and management foci that can be compared with *HTI* development.

Due to the more complicated institutional arrangements implemented by FI, as discussed in Section 5.4.1, the total overhead costs at 37% are much higher than for WKS and *HTI* management in general (Table 5-10). Overall, in relation to the partnership schemes implemented by WKS and FI, additional overhead costs borne by partnership schemes include indirect overhead costs, for example the cost of negotiation processes, conflict resolution and forest protection. Conflict resolution is an important part of the land acquisition processes under the partnership scheme. The other main important cost component under the partnership scheme in comparison to *HTI* management is the funds allocated to cover the transaction costs; these could account for up to 29% of total costs, as in the case of FI. Transaction costs in this scheme mainly capture the costs of the processes in setting up the institutional arrangements and the contractual agreement.

Under *HTI* schemes, most of the costs (59%) are plantation development costs allocated to ensure that optimum productivity can be achieved. Field observations indicated higher productivity of timber per ha on company plantation areas, about 20–30 m^3/ha higher than that on partnership areas (WKS Contractor 1, pers. comm., 11 January 2009, WKS Contractor 2, pers. comm., 11 January 2009). The nature of the cost components under the WKS Scheme is comparable to that of industrial plantation management, except for the additional transaction costs (2%). The reasons for the differences between WKS and FI are discussed below.

Table 5-10. Comparison of the proportions of the different cost components in the partnership scheme and industrial plantation

Cost components	Proportion of cost		
	Partnership scheme [a]		Industrial plantation [b]
	FI	WKS	
1. Investment	17%	23%	22%
2. Plantation development costs	11%	51%	59%
3. Timber harvesting and transporting	7%	1%	1%
4. Overhead [c]	37%	23%	17%
5. Transaction costs [d]	29%	2%	-
Total	100%	100%	100%

File: Compilation Jambi & Sanggau 220611.xls - Comparison Kemitraan & HTI (2)

Notes:
a. The average proportion from FI and WKS Scheme implementation.
b. Implementation based on *HTI* implementation conditions.
c. Include direct (2%) and indirect overhead costs (35%). Direct overhead costs as part of harvesting and transportation costs and related timber tax refer to *PSDH (Provisi Sumber Daya Hutan)*; and indirect overhead costs include funds for negotiation processes, conflict resolution and forest protection.
d. Transaction costs refer to the additional costs when compared to the business-as-usual development of timber plantations with no partnership under the *HTI* scheme, such as for setting up the institutional arrangements and the contractual agreement.

Sources: (a) Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); Pokja Pemberdayaan Masyarakat (2006).
(b) Summarised from Jurgens *et al* (2005) and Jurgens (2008).

Looking in more detail at the cost structures in the partnership schemes for both FI and WKS (Table 5-11), the indirect overhead costs that cover funding mainly for the negotiation processes and conflict resolution comprise the highest proportion of costs (35%) spent by FI. Community labour allocation to developing rubber plantations is the second-highest cost component, at 26% under the FI Scheme, which includes incentives to develop rubber plantations. Rubber is very important to the local villagers' livelihood strategies; therefore, it is important to take into account the community's contribution in developing and maintaining the rubber plantations, mainly through allocating their labour.

However, the analysis based on the costs of timber production only for FI shows a lower proportion of indirect overhead costs (18%), with the dominant proportion of the costs being for investment (41%). The high allocation of these investment costs occurs mainly because the *HTI* areas in FI are very remote, with difficult access due to the limited road infrastructure. When the company started the plantations, the concession areas consisted mainly of Imperata grassland, bushes and secondary scrub (Potess, 1995; 1997; Nawir *et al.*, 2003b). Closer to villages, especially in the Sanggau area, there was a mixed mosaic of vegetation, including village rubber and *tembawang*, with forest along the streams (Potter and Lee, 1998).

The most significant cost under the WKS Scheme is that of plantation development (51%) (Table 5-11). This reflects the greater emphasis on following the silvicultural requirements for acacia plantation development. The second important cost component for WKS is investment costs (23%), followed by indirect overhead costs (17%). As further discussed in Section 5.5.4, community partners involved in the partnership scheme managed by WKS tend to be occupied in managing other household land as part of their livelihood strategies, particularly the oil palm and rubber plantations. The community's focus on other plantation crops allows the company to focus solely on timber plantation development, and it does not have to provide an additional incentive scheme. As in the case of FI, an incentive package is provided to attract prospective community partners. For example, this is implemented by providing assistance for the purchase of rubber seedlings that can potentially fill the gap in income during the period until the acacia is harvested. In comparison to products coming from rubber and oil plantation management, products that are considered to be estate crops, procedures for land clearing and land preparation do not have to go through the same processes for obtaining permits as is the case for the development of acacia plantations (Ardiansyah, 2006; Peramune and AFS, 2007; SETARA *et al.*, 2007; Zen *et al.*, 2008). In addition, the procedures for harvesting and transporting the products are also simpler (Peramune and AFS, 2007; SETARA *et al.*, 2007).

As the analysis of the cost structure suggests, there is a clear link between the way a company conceptualises the partnership scheme and the way it addresses the local challenges and the dominant cost components affecting the scheme's feasibility and profitability. As reflected in the cost component structures, the initial design of the partnership scheme of FI focuses on facilitating the land acquisition processes. This has been done mainly by developing the incentive package to attract prospective community partners, which is also part of the mechanism used by the company to resolve conflicts over land inside the concession areas. Unfortunately, the current management of FI inherited a very generous incentive package that was not balanced by a similar focus on silvicultural practices to meet the optimal acacia productivity required for feasible management (Nawir *et al.*, 2003b).

In learning from its past experiences in developing partnership schemes inside its concession, WKS has shifted its approach to expand the partnership schemes outside its concession, on privately owned lands outside state forests. The approach taken by WKS has been possible because the community has been kept busy managing other significant areas of land allocated to alternative uses. Further, WKS also has the advantage of its own acacia plantations, amounting to about 293,812 ha (Anonymous, 2009b; a; Munoz, 2010).

The results discussed in Section 5.5.1 and the analysis of the economic feasibility and profitability show that the acacia productivity level is crucial to the level of benefits that can be expected from the partnership scheme. For future management, there are many areas for improvement to make the partnership scheme more feasible, more profitable, and provide competitive benefits to the local community.

Table 5-11. Cost components of community-company partnership schemes [a]

Cost components	Community-company partnership schemes		
	FI [b]		WKS [c]
	Timber and rubber	Timber only	
1. Investment [e]	17%	41%	23%
2. Plantation development costs			
2.1. Land preparation and planting	9%	21%	40%
2.2. Maintenance	2%	5%	11%
Total 2	11%	26%	51%
3. Timber harvesting and transporting			
3.1. Administration (overhead cost) [f]	2%	2%	6%
3.2. Harvesting	0.2%	1%	0.2%
3.3. Local transporting and operational log pond	7%	10%	0.4%
Total 3	9%	13%	7%
4. Initiating partnership with communities			
4.1. Royalty payments	0.004%	0.01%	1%
4.2. Incentives package	2%	1%	-
Total 4	2%	1%	1%
5. Indirect overhead costs [g]	35%	18%	17%
6. Community's contribution [h]			
6.1. Supervision and fire prevention	0.4%	1%	1%
6.2. Times for group meetings and negotiation	0.1%	0.1%	0.3%
6.3. Rubber plantations management [i]	26%	-	-
Total 6	26%	1%	1%
Total proportion (1 + 2 + 3 + 4 + 5 + 6)	100%	100%	100%

File: Compilation Jambi & Sanggau 220611.xls - Summary Cost components (2)

Notes:

a. Based on current partnership scheme arrangements.

b. FI Scheme includes timber and rubber plantation development.

c. WKS Scheme includes acacia planting only.

d. Investment cost is estimated to include infrastructure, such as roads.

e. Overhead costs as part of harvesting and transportation costs and related timber tax refer to *PSDH (Provisi Sumber Daya Hutan).*

f. Indirect overhead costs cover the funding for negotiation processes, conflict resolution and forest protection.

g. The community's contribution was estimated from hours of labour allocated by the community based on the information obtained from the survey.

h. For the FI Scheme, the community's contribution included estimated costs for rubber plantation development, such as for labour, fertiliser and tools/equipment.

Sources: Analysed from data collected during survey in Jambi and Sanggau (4-21 January, 2009) and Wulan *et al* (2006).

5.5.3. Risks to the long-term feasibility of the partnership scheme: the importance of maintaining community partner commitments

It is not only the companies that have learnt about the many adjustments required from their experience in implementing the first rotation of the tree-growing partnership schemes. For the community, the decision to continue to participate in the partnership scheme depends on a number of factors, but principally on the net benefits received in the first rotation.

These perceptions are reflected in the responses of respondents surveyed among the community partners of both schemes (55 households involved in the FI Scheme and 40 households in the WKS Scheme), who had the experience of implementing the first rotation of the partnership scheme (Table 5-12). These community members were asked three questions, which focused on their perceptions of the manageability, reliability and profitability of acacia plantations in comparison to rubber and oil palm plantations, as well as their agricultural practices such as cultivating paddy in dry rice fields.

Among those who had joined the FI Scheme, most community members responded that managing acacia plantations is harder than for rubber (73%) and agriculture (75%); only a minority of respondents (38%) felt that was the case in comparison to oil palm plantations. This is mainly because rubber and agricultural practices have been part of the local community's livelihood strategy for a long time; consequently, the local community is quite familiar with managing rubber plantations and cultivating paddy on dry rice fields. Furthermore, the local cultivation practices in the traditional systems are not as intensive as for large-scale plantation management. The community leaves the trees after seedlings are planted, with minimum maintenance and weeding, and returns when the trees are mature and ready for harvest. Oil palm and acacia plantations were introduced at almost the same time, in the early to mid-1990s (Zen *et al.*, 2008; Sirait, 2009), therefore the community has not yet become as familiar with managing either of these types of plantations. Community members' perception of the profitability and reliability of the benefits from acacia and oil palm plantations, in comparison to rubber and agricultural practices, followed a similar pattern to their perception of the relative difficulty of managing the crops.

Table 5-12. Perceptions of manageability, profitability and reliability of acacia plantations as part of community livelihood strategy [a]

a. How manageable is acacia plantations in comparison to rubber, oil palm and agriculture?				
Partnership schemes	Manageability	Percentage of responses on acacia management in comparison to		
		Rubber plantation	Oil palm plantation	Agricultural practices
FI	a. Harder	73	36	75
	b. Easier	25	24	18
	c. Indifferent	2	40	7
	Total	100	100	100
WKS	a. Harder	35	38	30
	b. Easier	63	55	49
	c. Indifferent	3	8	22
	Total	100	100	100
b. How profitable is acacia plantation as income source in comparison to rubber, oil palm and agriculture?				
Partnership schemes	Profitability	Percentage of responses on acacia management in comparison to		
		Rubber plantation	Oil palm plantation	Agricultural practices
FI	a. More profitable	18	15	11
	b. Less profitable	82	44	75
	c. Indifferent	-	41	15
	Total	100	100	100
WKS	a. More profitable	22	13	22
	b. Less profitable	73	76	57
	c. Indifferent	5	10	22
	Total	100	100	100
c. How reliable is acacia plantation as income source in comparison to rubber, oil palm and agriculture?				
Partnership schemes	Reliability	Percentage of responses on acacia management in comparison to		
		Rubber plantation	Oil palm plantation	Agricultural practices
FI	a. More reliable	18	15	13
	b. Less reliable	82	46	76
	c. Indifferent	-	39	11
	Total	100	100	100
WKS	a. More reliable	34	23	35
	b. Less reliable	61	69	43
	c. Indifferent	5	8	22
	Total	100	100	100

File: Data analysis\CBA Jambi & Sanggau\SPSS preference rubber oil palm.xls - Comparisons (3)

Notes:
a. Analysis is based on responses by surveyed respondents who gave answers to these questions in FI (n = 55) and WKS (n = 40). Total number of responses varied.
Sources: Analysed from data collected during survey in Jambi and Sanggau (4-21 January, 2009).

In contrast, most community members of the WKS Scheme were more familiar with oil palm plantation management (see Section 5.5.4); a small majority perceived that managing acacia plantations under the partnership scheme was easier than managing rubber (63%) or oil palm (55%) plantations, and a small minority (49%) perceived it as more difficult than rice cultivation. Due to their familiarity with oil palm and its estimated benefits, community members' perceptions about the profitability and reliability of acacia plantations in comparison to other crops were mostly negative.

Perceptions of community members who participated in the partnership schemes implemented both by FI and WKS indicated that the community's attachment to the partnership scheme was not firm. In particular, after a community received its share of benefits from the first rotation, there were mixed perceptions among community members about whether they planned to continue to the second rotation or not. It was evident in the conduct of the surveys that these perceptions were influenced by the decisions and the perceptions of the heads of cooperatives/sub-villages.

Analysis of data collected during the survey in Jambi and Sanggau (4-21 January, 2009) indicates that the community seemed to have too high an initial expectation of the benefits that could be obtained from acacia plantations, as well as of the roles of companies in providing significant benefits to the community. Under the FI Scheme, about 86% of households had their land planted for the second rotation; but under the WKS Scheme, only about 26% of households continued to the second rotation (Table 5-13). However, the result for WKS could be partially explained by the fact that some of the households interviewed (20%) had not yet harvested their timber from the first rotation (Fieldwork in Jambi, 2009).

Table 5-13. Perceptions of manageability, profitability and reliability of acacia plantations as part of community livelihood strategy [a]

Community-company partnership scheme	Number of households		
	Joining the first rotation	Implementing planting for the 2nd rotation	
	n	n	(%)
FI	59	51	86%
WKS	42	11	26%

File: 2nd Rotation analysis - Sheet2

Sources: Analysed from data collected during survey in Jambi and Sanggau (4-21 January, 2009).

Timber harvested from the partnership areas has become an important part of the companies' supplies of raw material; for example, in the case of WKS, partnership schemes provide 35% of the additional wood above the current company-owned plantation supply (WKS, 2008). Therefore, maintaining the community's commitment is very important from the company perspective. To maintain the community's commitment to the partnership scheme, the company needs to set the timber royalty received by community members under the benefit-sharing agreement at a level attractive enough in comparison to the most important alternative land uses, notably rubber and oil palm plantations (see Section Box 6-7 in Chapter 6 for further discussion). The willingness of a community to continue its commitment to the partnership scheme in the long term is mainly determined by the price signals, because other factors in the case of partnership schemes, such as market for timber produced and recognition of land ownership, are secured by the company.

5.5.4. Potential impacts on livelihoods

The analysis of potential impacts on livelihoods focuses on the estimated benefits from timber received by a community as part of the benefit-sharing agreement included in the contract. A comparison with average rural household incomes in the Jambi (in terms of WKS Scheme) and West Kalimantan (in terms of FI Scheme) Provinces is also made. However, the household benefits are defined by the land management characteristics at the household level, which are discussed here first.

5.5.4.1. Land management characteristics

The potential impacts on the livelihoods of community members from their involvement in the partnership schemes are estimated by taking into account the proportion of land handed over to be planted with acacia. For the FI Scheme, the average area of land managed by participating households (18.1 ha) was nearly three times greater than the average landholding at the district level (7.1 ha) (Table 5-14). Households allocated an average of 12.8 ha (71%) of their total land to acacia plantation, on average scattered across four plot locations. Households also have land managed mostly for jungle rubber, with an average area of 5.3 ha per household; for agriculture (5.1 ha), particularly wet and dry rice fields; and for oil palm plantations (7.2 ha). Not all households have the three types of land all together; the distribution of households owning these types of land is 56% owning rubber plantations, 41% owning agricultural fields, and only 2% owning oil palm plantations. One household can have more than one of these types of land uses. Customary land tenure according to traditional Dayak rules still dominates individual land status in Sanggau.

In the WKS concession areas, the average area held by participating households (13.48 ha) was less than that under the FI Scheme, but it was also much larger—more than six times the average district landholding (1.94 ha). On average, households involved in the WKS Scheme handed over only one plot per household, and at a smaller area than the community in FI, at 6.35 ha, which accounts for less than 50% of the total land managed per household surveyed in the area (Table 5-14). Households also have land that they manage for jungle rubber with an average area of 7.24 ha per household, for agriculture (1.75 ha) particularly wet and dry rice fields, and for oil palm plantations (12.01 ha). Not all the households have the three types of land: 48% of households own rubber plantations, 23% own agricultural fields and 29% own oil palm plantations. One household can hold more than one of these types.

The average area allocated by each household involved in the WKS Scheme was lower, in both absolute and proportional terms, than the average area allocated by each household joining the FI Scheme. Conversely, the proportion of household areas allocated to rubber and oil palm plantations and agriculture was higher. The community in WKS was less dependent on the partnership scheme initiative in utilising their land, since there was a higher proportion of land allocated for other purposes. The trend around the WKS area was mainly driven by the existing and growing markets and industries for latex and oil palm fruit, which is the case in most parts of Sumatra. Conversely, since there were limited opportunities in Sanggau, the community involved in the FI Scheme had higher expectations of deriving significant benefits from participating in the acacia plantation partnership scheme.

Table 5-14. Land ownership characteristics among survey respondents as part of concession areas of Finnantara Intiga (FI) and Wirakarya Saki (WKS)

Description	Case studies		
	FI (n = 59)	WKS (n=45)	Average
1. Land managed per household (ha)	18.11	13.48	15.80
2. Land handed over under partnership scheme [a]			
a. Areas under partnership (ha/ousehhold)	12.79	6.35	9.57
b. Proportion to total household lands (%)	71%	47%	61%
c. Number of plots (plots/household)	4	1	3
d Areas per plot (ha/plot)	3.06	4.87	3.97
3. Other household land			
a. Non-partnership areas (ha/household)	5.32	7.13	6.23
b. Proportion to total household lands (%)	29%	53%	39%
c. Number of plots (plots/household)	3	2	2
d Areas per plot (ha/plot)	1.94	3.36	2.65
4. Land uses of other household land [b]			
a. Rubber plantation (ha/household)	5.27	7.24	6.26
b. Oil palm plantation (ha/household)	7.24	12.01	9.63
c. Agricultural areas (ha/household) [c]	5.07	1.75	3.41
5. Average area of land managed at district level (ha/household)	7.10	1.93	4.51

File: CompilationJambi & Sanggau.xls - Land managed characteristics

Notes:

a. Used as part of company plantation development areas using similar standard of standing stocks per ha for acacia plantation (see Appendix 5-3 for more explanation on assumptions used in the analysis).

b. Not all households have the three types of land all together, so the average figures are estimated from those who own a specific piece of land either for rubber, oil palm plantations or agricultural areas. However, one household might have more than one piece of land.

c. Includes dry land for paddy and wet rice fields, mostly for family subsistence needs.

Sources: Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009).

Based on the characteristics of land ownership of the community partners involved in the survey, it is evident that it is principally those with larger landholdings who participate in acacia plantation partnership schemes. It is fair to say that the community-company partnership arrangement is not suitable for villagers who do not have sufficient land. These land-poor community members are usually the poorest, with the lowest socio-economic status. However, these community members are usually involved as labour in the plantation areas and use the opportunities provided by the leader of the contracting group or company.

5.5.4.2. Estimated annual benefits at the household level from participating in partnership schemes

The main financial benefits under partnership schemes are derived from harvesting the timber from acacia plantations; the benefits are shared between the company and community partner as set down in the contract (see Section 5.3.2 and 5.4.2). As discussed in Section 5.5.1, the timber benefits derived are determined by several factors, mainly by the volume of timber produced per ha and the period of the contract in terms of the number of rotations of timber production contracted. At the household level, the distribution of benefits is determined by the size of the area allocated by the individual household for inclusion in the partnership scheme.

Under the FI Scheme, participating households receive estimated annual timber benefits ranging from Rp 257,488 (AUD 31), for management of one rotation based on current acacia productivity, to Rp 1.4 million (AUD 169), based on the company's standard acacia productivity and for the maximum contract period (Table 5-15). The proportion of timber benefits received by the community members accounts for only 1% of the total benefits received by the company, based on a benefit-sharing agreement of 10% of total timber volume calculated at a fixed royalty of Rp 15,000 per m³. The analysis over the whole partnership contract period indicates significant estimated benefits from rubber plantations, accounting for Rp 14 million (AUD 1,680), on the basis of the average size of rubber plantation per household of 5.3 ha. Taking into account the incentive package provided by FI, the community also receives annual benefits of a minimum of Rp 672,742 (AUD 81) for one rotation and Rp 1.2 million (AUD 143) for the total period of the partnership contract. So, in total, the community receives benefits up to a maximum of Rp 16 million (AUD 1,992) for the total period of the partnership contract, based on the company's standard acacia productivity, which is better overall than the return expected from rubber at the current productivity level, as discussed further below.

Despite the (money) incentive provided by the company for the community to buy seedlings of high-yield rubber varieties, the community still uses seedlings of local species collected from its own rubber plantations (Head of sub-village 2 and 3, pers. comm., 18 January 2009). Local rubber has a lower productivity (about 51%) than the lowest high-yield rubber variety, and requires more labour-intensive management (Anwar, 2001; Wulan *et al.*, 2006). The rubber price at the farm gate is set based on a formulae that refers to the FoB price on the international market for latex, which is also sensitive to the dynamics of the global economy, e.g. under the situation of a global economic crisis (Anwar, 2001; Peramune and AFS, 2007). Therefore, the benefits from rubber also reflect the low productivity and the uncertainties of fluctuating international prices.

Community members participating in the WKS Scheme over the whole contract period receive annual benefits of an estimated Rp 12 million (AUD 1,477) for their share of timber benefits (Table 5-15), which is about 14% of the company's shares of timber benefits at the company standard for acacia productivity. However, on the basis of current smallholder acacia productivity, the company makes a negative benefit of Rp 31 million (AUD 3,827), while it still has to pay royalties to community partners Rp 8.8 million (AUD 1,055). Community members involved in the WKS Scheme often use the benefits received for reinvestment in land for oil palm plantations; this is the case even for those households who receive significant benefits (up to Rp 40.5 million or AUD 4,800) (Head of Cooperative 3, pers. comm., 9 January 2009). Other households that receive lesser benefits (up to Rp 4.5 million or AUD 534) typically use the money for their children's schooling and daily needs (Head of Cooperative 2, pers. comm., 9 January 2009).

Table 5-15. Estimated annual financial benefits received by household and company

Annual benefits [a]	FI		WKS	
	Rp	AUD	Rp	AUD
A. Total period of partnership contract analysis [b]				
a. Using company standard of acacia productivity [d]				
1. Company annual timber benefits	248,655,869	29,808	87,951,932	10,543
2. Household annual benefits				
Timber	1,413,839	169	12,324,545	1,477
Rubber	14,015,700	1,680	-	-
Incentive package [c]	1,189,839	143	-	-
Total	16,619,377	1,992	12,324,545	1,477
b. Using current acacia productivity [d]				
1. Company annual timber benefits	83,468,611	10,006	(31,923,073)	(3,827)
2. Household annual benefits				
Timber	474,596	57	8,798,930	1,055
Rubber	14,015,700	1,680	-	-
Incentive package [c]	1,189,839	143	-	-
Total	15,680,135	1,880	8,798,930	1,055
B. One rotation analysis [b]				
a. Using company standard of acacia productivity [d]				
1. Company annual timber benefits	134,696,823	16,147	160,697,496	19,264
2. Household annual benefits				
Timber	765,876	92	3,591,260	431
Rubber [e]	-	-	-	-
Incentive package [c]	672,742	81	-	-
Total	1,438,618	172	3,591,260	431
b. Using current acacia productivity [d]				
1. Company annual timber benefits	45,285,077	5,429	72,791,623	8,726
2. Household annual benefits				
Timber	257,488	31	2,797,012	335
Rubber [e]	-	-	-	-
Incentive package [c]	672,742	81	-	-
Total	930,230	112	2,797,012	335

File: Compilation Jambi & Sanggau 220611.xls - Annual Benefit Comp&Community (4)

Notes:

( ): Negative value

a. Estimated from EAE for the all areas used in the analysis (250 ha for FI and 229 ha for WKS. See more explanation in Appendix 5-3).

b. Total period: 39 years in FI and 30 years in WKS; one rotation: seven years for FI and five years for WKS.

c. Incentive package received is estimated annually (see Section 5.4.2 for details of types of incentives).

d. Company productivity standard refers to optimal target productivity (150 m³/ha); current productivity is based on survey information (106 m³/ha in FI and 107 m³/ha in WKS).

e. There is no rubber production for one rotation analysis; it starts to produce at year 10.

Sources: Analysed from data collected during revisited survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009).

Based on a single rotation analysis, both levels of acacia productivity provide positive total benefits, with greater benefits for the company than for the community members. Benefits for the company range from Rp 72.8 million (AUD 8,726), based on current productivity, to Rp 160.7 million (AUD 19,264) based on the company's standard productivity. Positive benefits accrue from single rotation management because the company applies a five-year rotation, which is more profitable than a longer rotation. This is also important for meeting the immediate wood supply needs of its processing industries. However, despite these advantages, community members receive a lesser estimated benefit per year than does the company, of Rp 3.6 million (AUD 431) based on the company's standard productivity and Rp 2.8 million (AUD 335) based on current productivity. Consequently, the WKS policy of providing a guaranteed six rotation-based partnership contract will provide greater income from timber to the community members, besides securing raw materials for the company's processing industry over the contract period. However, this should be complementary to favourable policy and economic incentives to improve the overall competitiveness of the scheme, as discussed further in Section 6.3.2 of Chapter 6.

These estimated incomes from timber under the partnership schemes can also be compared with average household income in rural areas of Jambi Province, where the WKS Scheme is situated, and in West Kalimantan Province, where the FI Scheme is situated. The average annual household income in Jambi and West Kalimantan provinces is Rp 2.2 million (AUD 257) and Rp 1.7 million (AUD 205), respectively (BPS, 2005b).[22] At the current productivity level under the partnership scheme at FI, if a community member joins the partnership scheme for the whole 39 years, the annual income from timber contributes a potential additional 27% to their income (Table 5-16). This contribution becomes higher, up to 82%, if the company standard acacia productivity target is met.

[22] The average annual household income data was for 2005, which was the data that could be collected during field work in 2009. The values were then adjusted using Consumer Price Index to 2009 value.

Table 5-16. Proportion of estimated annual financial timber benefits to the average income of households in the rural areas in Jambi and West Kalimantan [a]

Estimated annual benefits [b]	Community-company partnership schemes	
	FI	WKS
A. Total period of partnership contract analysis [c]		
a. Using company standard of acacia productivity [d]	82%	568%
b. Using current acacia productivity [d]	27%	406%
B. One rotation analysis [c]		
a. Using company standard of acacia productivity [d]	44%	166%
b. Using current acacia productivity [d]	15%	129%

File: Compilation Jambi & Sanggau 220611.xls - Annual Benefit Comp&Communi (3)

Notes:

a. According to CBS, the average household income in Jambi province is Rp 2.2 million (AUD 257) and Rp 1.7 million (AUD 205) in West Kalimantan Province (BPS, 2005).

b. Estimated from EAE for all areas (250 ha for FI and 229 ha for WKS-see explanation in Appendix 5-3).

c. Total period of contract is 39 years in FI and 30 years in WKS; one rotation is seven years for FI and five years for WKS.

d. Company productivity standard refers to optimal target productivity in *HTI* development (150 m^3/ha); current productivity is based on survey information (106 m^3/ha in FI and 107 m^3/ha in WKS).

Sources: Analysed from data collected during revisited survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009).

Comparing the potential additional income of a household under the WKS Scheme to the average income of a household in the rural areas in Jambi, there is a significant potential additional income from timber benefits under the partnership scheme. If the partnership is implemented for the total period of the partnership contract and if the company standard of acacia productivity can be met, the additional income to a household from timber benefits can amount to more than five times (568%) the average per year. The least favourable case is an increase of 28% to average household income.

As part of the household income strategy, labour opportunities provided under partnership schemes can be considered as a promising source of income, as reflected in the parameters return to labour ratio and the average wage of labour at NPV equal to zero (Table 5-17). Overall, the return to labour for the total period of a partnership contract is higher than that for a one-rotation contract. For the total period of a partnership contract, the return to labour ratio ranges from eight, under the WKS Scheme at the current acacia productivity level, to 24 for the joint timber and rubber plantations under the FI Scheme. Implementing the partnership scheme for one rotation provides the lowest return to labour ratio, at seven for WKS at the current acacia productivity level; the highest ratio is 13, for the joint timber and rubber plantations under the FI Scheme.

Taking into account the average wage for a labourer at the condition of NPV equal to zero, the highest possible returns are for timber management only under the FI Scheme; this is higher than the current labourer wage at Rp 26,000 (AUD 3) per person working day, according to data collected during fieldwork (4-21 January, 2009) (Table 5-17). These favourable returns apply to current and company productivity scenarios for the total period of the partnership contract and one rotation analysis. Both the return to labour ratio and the return to labour value are high because the management of FI plantations is less labour-intensive, due to the low intensity of plantation-based activities and the less intensive plantation development and silvicultural practices. The results for the FI Scheme indicate that combining timber and rubber plantations provides the highest benefits for each dollar of labour costs allocated, from the community member's perspective. In terms of timber management, the community members who benefit most are contractors. The rubber plantation management returns from each dollar of labour allocated benefit mainly the community members in the partnership scheme.

Table 5-17. Average return to labour for labourers in the areas surrounding FI and WKS concessions [a]

Annual benefits	Community-company partnership schemes		
	FI [b]		WKS
	Timber and rubber	Timber only	
A. Total period of partnership contract analysis [c]			
a. Using company standard of acacia productivity [d]			
1. Return to labour ratio	24	6	11
2. Return to labour			
Rp/person working day	159,374	163,452	37,961
AUD/person working day	19	20	5
b. Using current acacia productivity [e]			
1. Return to labour ratio	20	10	8
2. Return to labour			
Rp/person working day	70,971	72,346	negative [f]
AUD/person working day	9	9	negative [f]
B. One rotation analysis [c]			
a. Using company standard of acacia productivity [d]			
1. Return to labour ratio	13	13	10
2. Return to labour			
Rp/person working day	71,177	163,327	161,535
AUD/person working day	9	20	19
b. Using current acacia productivity [e]			
1. Return to labour ratio	9	9	7
2. Return to labour			
Rp/person working day	negative [f]	72,221	83,092
AUD/person working day	negative [f]	9	10

File: Compilation Jambi & Sanggau.xls - Return to labour & minimum wage (4)

Notes:

a. Average wage for return to labour was estimated at break-even point (NPV = 0) in comparison to the current wage level at Rp 26,000 (AUD 3) in FI areas and Rp 36,530 (AUD 4) in WKS areas.

b. The partnership scheme under FI includes timber and rubber.

c. Total period: 39 years in FI and 30 years in WKS; one rotation: seven years for FI and five years for WKS.

d. Company productivity standard refers to optimal target productivity in *HTI* development.

e. Current productivity was actual productivity based on survey information.

f. Negative values following the unfeasible management option (Table 5-6).

Sources: Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009).

Under the WKS Scheme, even when based on the company's standard of acacia productivity for the whole period of a partnership contract, the estimated minimum wage for labour is low, at Rp 37,961 (AUD 5), which is similar to the current labourer's wage at Rp 36,530 (AUD 4). This occurs mainly because, in the WKS Scheme, labour-intensive management practices are implemented by the company, as reflected in the high costs allocated to plantation development and in their adoption of standard plantation silvicultural practices (see Section 5.5.2).

Comparing the conditions under the FI and WKS Schemes, there are four important points to be highlighted. First, the partnership scheme arrangements, which include the benefit-sharing agreement and the standard defined by the company for royalty payment, define the level of benefits received by household partners. Regardless of the fact that the average size of land contributed to the partnership scheme by an individual household under the FI Scheme is double that under the WKS Scheme, the timber benefits received by a household are much lower from the FI Scheme than from the WKS Scheme. This is mainly because the benefit-sharing agreement of FI provides for income to households of only 10% of the timber volume harvested, with fixed lower royalty payments of Rp 15,000 (AUD 1.78) compared to those set by WKS, which range from Rp 30,000 (AUD 3.56) to Rp 50,000 (AUD 5.93), differentiated by the distance from the plantation to the processing mills. The second point is that, taking into account the other types of benefits generated under the FI Scheme, participating households are better off than they would be from any alternatives, in terms of total benefits from rubber plantations and incentive packages in addition to the shared timber benefits. The incentive package consists primarily of land incentives and funds for infrastructure development (see Section 5.4 for detailed description of the incentive package). Third, while rubber plantations can provide supplementary income under the partnership arrangement, the main threats to the WKS Scheme in maintaining the community's commitment are the external pressures from rubber and oil palm plantations, since more than 50% of land allocated by households is devoted to these crops. With a rapidly growing market, mainly for oil palm, a company has to constantly update its royalty payment standard if acacia growing is to remain competitive. Lastly, in terms of having a partnership arrangement for the total period of the partnership contract in comparison to a contract for just one rotation, as is increasingly being implemented by FI in initiating new contracts, there are certain conditions to be considered. If the plantation development costs account for about 50%

of the total partnership costs, one-rotation management is more likely to be implemented if acacia is planted for a shorter rotation (five years), as is done by WKS. In the case of the FI Scheme, where the plantation costs are only about 11% to 27% and acacia is planted based on a longer rotation (seven years), acacia plantation development can feasibly be managed for the whole period of the contract or for one rotation only. However, while the company still makes a profit under these scenarios, benefits to a household are significantly lower in the case of single-rotation management, particularly at the current acacia productivity level, as indicated by the negative value estimated as the minimum wage for labour.

5.5.4.3. Benefits in comparison to other investment alternatives

As land use is highly competitive, developing acacia plantations should have a relative advantage in comparison with other competing local alternatives, mainly rubber and oil palm plantations. Rubber plantation management based on local practices provides some positive annual benefits to a household, but only at the average price (Rp 2.7 million or AUD 316) per year per ha (Table 5-18). Under the influence of the global economic crisis, the estimated annual benefits from rubber become negative, since local rubber prices are sensitive to those on the international market. Using high-yield rubber species provides higher positive benefits at Rp 7.9 million (AUD 938) per year per ha, even with the low prices due to the economic crisis. Local practices of rubber management in Sanggau (average productivity: 403 kg/ha/year) compare unfavourably to the national average (in 2005) of 862 kg per ha per annum (Peramune and AFS, 2007). Potentially, high-yield rubber species provide an average productivity of 917 kg/ha/year (Wulan *et al.*, 2006). However, low productivity levels have kept rubber cultivation vulnerable to over-exploitation when prices are high, and when prices are low, temporary abandonment by not doing the tapping is quite common (Peramune and AFS, 2007). Some income could be obtained from other species in the gardens or in the *tembawang*. This indicates that whatever commodity price is high determines the choice of investment and livelihood strategy made by the community at that time.

For oil palm plantations, the estimated positive benefits are Rp 2.9 million (AUD 349), but only under management practices which deliver optimum yield and the price does not diminish. Other option, at a lower productivity level and under low price level during the global financial crisis, results in negative estimated benefits for individual households. With a higher productive, smallholders would survive the low price during the financial crisis with Rp 1.9 million (AUD 141) annual benefits.

The net income from rubber latex and oil palm production are both sensitive to price changes, especially if the productivity per ha is low, such as under traditional practices. Farm gate prices of both commodities are sensitive to international price changes, since local prices at the farm gate are defined by applying a formula that uses FoB prices as the main component of the formula (Peramune and AFS, 2007; SETARA *et al.*, 2007; Zen *et al.*, 2008). After the economic crisis in early 2009, it took about two years for the price to recover from the lowest level to the normal price prevailing before the crisis (SMERU, 2009). For example in Jambi, the price per kg in 2010 for fresh fruit bunches from oil palm trees was Rp 1,100–1,553 (AUD 0.18) compared to the price per kg during the crisis of around Rp 300 (AUD 0.04) (SMERU, 2009; Fieldwork in Jambi and Sanggau, 2009; Anonymous, 2010b). The price per kg for rubber was around Rp 12,000 (AUD 1.42), compared to during the crisis period at Rp 2,000–4,000 (AUD 0.23–0.47) (SMERU, 2009; Fieldwork in Jambi and Sanggau, 2009; Anonymous, 2010a). Up until recently, the prices of fresh fruit bunches from oil palm plantations and latex from rubber plantations in Sumatra and Kalimantan have been fluctuating and tend to decline to the level of the price during the global financial crisis period (Mohanty, 2011; Suara Pembaruan, 2012; eksposnews.com, 2012).

Table 5-18. Comparisons of annual benefits and values of land between timber and the other investment alternatives of rubber and oil palm plantations

Investment alternatives	Financial benefits			
	Annual financial benefits [a]		Values of land [b]	
	Rp/year/ha	AUD/year/ha	Rp/ha	AUD/ha
a. Rubber [c]				
1. Local practises under normal prices	2,660,843	316	33,260,534	3,945
2. Local practises under low prices	(215,517)	(26)	(2,693,966)	(319)
3. High yield plantation under normal prices	7,906,688	938	98,833,606	11,721
4. High yield plantation under low prices	1,940,527	230	24,256,583	2,877
b. Oil palm plantations [d]				
1. Local practices under normal prices	924,457	110	11,555,715	1,370
2. Local practices under low prices	(2,710,691)	(321)	(33,883,632)	(4,018)
3. High yield practices under normal prices	2,944,136	349	36,801,703	4,365
4. High yield practices under low prices	1,189,131	141	14,864,135	1,763
c. Timber investment [e]	6,869,192	815	3,834,342	455

File: CompilationJambi & Sanggau.xls - Rev Other investment combine

Notes:
( ): Negative value
a. Estimated based on EAE-Equal Annual Equivalent (see Chapter 3, Section 3.3.3).
b. Estimated based on TEV-Total Economic Value (see Chapter 3, Section 3.3.3).
c. Rubber practice is based on analysis in Sanggau (adapted from Wulan *et al* (2005), with additional analysis based on local practices using the level of productivity obtained during the fieldwork in Sanggau (2009) and using normal prices before the economic crisis (see Appendix 5-3 for more details).
d. The oil palm practice is based on the partnership scheme implemented in the area of South Sumatra Province adjacent to the WKS Scheme area in Jambi (adapted from Sulistianawati (2010), with similar additional analysis such as the rubber practice analysis (see Appendix 5-3 for more details).
e. Timber investment is an average of EAE and TEV values from the two community-company partnership schemes.

Sources: Fieldwork in Jambi and Sanggau, 4-21 January, 2009, Wulan *et al* (2005); and Sulistianawati (2010).

Comparing return to labour and minimum wage for labour parameters for rubber and oil palm plantations (Table 5-19) with acacia plantations (Table 5-17), it is evident that under current acacia productivity the average wage of labour is comparable with rubber and oil palm plantations at Rp 77,156 (AUD 9) and Rp 48,174 (AUD 6) respectively, except for the high-yield rubber plantations Rp 190,637 (AUD 23). Even acacia plantations at current productivity provide a higher return to labour in comparison to that from the rubber and oil palm plantations with high yield and calculated at the normal price before the global financial crisis hit the Indonesian economy.

Table 5-19. **Return to labour from rubber and oil palm plantations** [a]

Annual benefits	Alternative land use		
	Rubber plantations [b]		Oil palm plantations [c]
	Traditional	High yield	High productivity
1. Return to labour ratio	1.40	3.52	1.36
2. Return to labour			
Rp/person working day	77,156	190,637	48,174
AUD/person working day	9	23	6

File: Compilation Jambi & Sanggau.xls - Return to lbr & min rubb & oil

Notes:

a. Estimated based on EAE and TEV (see Chapter 3, Section 3.3.3) and values included in Table 5-18.

b. Rubber practice is based on analysis in Sanggau (adapted from Wulan *et al* (2005).

c. The oil palm practice is based on the partnership scheme implemented in the neighbouring area (in South Sumatra Province) (adapted from Sulistianawati (2010).

Sources: Fieldwork in Jambi and Sanggau, 4-21 January, 2009, Wulan *et al* (2005), and Sulistianawati (2010).

5.6. Discussion: implications for feasible small-scale commercial tree-growing

After more than ten years of implementation of company-initiated partnership schemes, as discussed below, there are several implications that affect the economic feasibility of the partnership scheme as part of small-scale commercial tree-growing strategies in Indonesia.

5.6.1. Implications of implementing community-company partnership schemes and the current overarching policy framework on their effectiveness

Specific implications are discussed below.

Partnership scheme development provides opportunities to transfer some benefits from large-scale plantation development to local communities. From local communities' perspectives, partnership arrangements have provided a means for them to realise direct benefits from large-scale plantation development that they had been denied for more than three decades. From the government's perspective, these company-driven partnership schemes have proven to be more effective than a range of government-driven programmes developed since the mid-1970s.

The existing policy and regulatory framework of the MoF's HTI Programme have not stimulated the wider adoption of the partnership schemes by other companies as part of their timber plantation management. In the absence of a specific legal framework for developing and implementing partnership schemes, most forestry companies have little confidence in adopting these programmes as part of their plantation programmes, and therefore have not invested in the development of community-company partnerships inside or outside state forests.

Developing a partnership on private land has become an option for companies to find more land for plantation development. The current policy and regulatory framework limiting the development of plantations inside state forests under partnership arrangements has driven companies to develop partnership schemes on privately owned lands outside state forests, as the case of plantations on privately owned lands developed by WKS illustrates. With promising potential areas for private tree-growing in Riau, Jambi and North Sumatra, where the pulp and paper processing plants are located, companies can take the opportunity to develop acacia plantations under partnership schemes. The main challenge for a company is to develop attractive incentives and benefit-sharing packages and keep their promises as initially agreed, otherwise conflicts with community partners cannot be avoided; these would lead community partners to prefer alternative crops, which are already attractive in many respects.

The different tenurial conditions associated with the different forest classifications applied in Indonesia have led to different arrangements for partnership schemes initiated by companies, with different implications for the cost structures and the benefits shared with community partners. As initially the partnership scheme was initiated as part of a conflict resolution mechanism over lands inside company concessions, companies developed incentive packages to attract prospective community partners to become involved and hand over their land for acacia plantations. The incentive package offered was being associated with the tenurial conditions of prospective partners. There are different packages offered to community members claiming the land inside the concession, and for those who own private land.

The effectiveness of initiating partnership schemes, particularly during the land acquisition processes, has been hampered by the difficulties in obtaining formal recognition of community members' land ownership documents. This is mainly because of the differences between land papers owned by most community members and those papers recognised by the formal system to show the legal ownership status.

There are various challenges to improving the development of timber plantations under partnership schemes; however, there are promising opportunities for community and private tree-growing arising from increasing wood prices associated with increasing gaps in wood supply to meet industry demand. In particular, because there are large gaps in meeting the current and growing demand from the wood industries, the continuing increases in timber prices provide attractive incentives for tree-growing. As well as in comparison to other crops, benefits from both rubber latex and oil palm production are sensitive to price changes, especially if the productivity per ha is low, such as under current management practices.

5.6.2. Implications of institutional and management arrangements in community-company partnership schemes

Companies have to design institutional and management arrangements that respond to the tenurial conditions of concession areas inside state forests, as discussed below.

The partnership arrangements have provided company access to lands claimed by local communities and buffer the concession areas from lands being claimed from other parties. This has been the case for both WKS, in their initial scheme, and for FI, where almost all of the areas are claimed by local communities. Initiating partnership schemes has been very important so that acacia plantations could be developed. After initiating and implementing partnership schemes, companies have been able to secure their access to the claimed areas inside concession areas.

The partnership arrangements have provided community access to company incentives and financial packages, in addition to the opportunities for gaining additional income from their unproductive/idle lands. From tree-grower partners' points-of-view, the fact that their land rights have been recognised is not as important as is commonly thought by those outside the community; access to income-generating activities, such as assistance with rubber seedlings and employment opportunities, is more important, at least in the short term. However, to maintain the community's commitment to the second rotation, the partnership needs to provide evidence that companies can keep their commitments, such as continuing attractive benefits from timber plantation management.

By developing partnership schemes, the company aims to create a social buffer zone to protect company plantations. By developing this social buffer zone, the company aims to protect and to secure its concession areas and operations against potential threats and land claims from other (non-partner) community members and investors looking for land, such as oil palm plantation companies.

Long-term commitments of community partners depend on the extent to which companies keep their commitments to the points agreed during initial negotiations and/or in the partnership contract. It is important that companies deliver what they have been promising, particularly in relation to incentives packages and shared benefits from harvested timber, and ensure the implementation of them. For example, a delay in harvesting decided by a company reduces the benefits that community partners could derive from using the lands if these were invested in competitor crops. Ideally, the partnership contract and/or negotiation processes should be conducted using a participatory approach, ensuring community partners' aspirations and concerns are taken into account and that the company has a better understanding of the aspects affecting community partners' commitments.

The long-term commitment of community partners is impeded because transferring the rights to heirs is not guaranteed. Based on *Permenhut* No. P. 23/Menhut-II/2007, the individual's rights will be revoked if the holder passes away. Considering the rights cover a long period of time (e.g. 39 years in the FI Scheme) and timber species commonly have a long rotation, an option to transfer the rights to the appointed holder's heirs is very important. This would help to ensure that the partnership scheme development could be continued and could provide a guarantee to both the companies and individuals involved.

5.6.3. Implications for the financial feasibility and profitability of community-company partnership schemes

Current policy, institutional and management arrangements have impacted the financial profitability as concluded below.

The implications of the procedures for companies initiating and implementing partnership schemes vary in their influence on the feasibility and profitability of the schemes. First, compared to the business-as-usual procedure in developing *HTI*, the transaction costs are high. There are trade-offs that companies need to consider, such as that having additional land under a partnership scheme means additional budget funds should be allocated to cover all the additional administrative procedures required. On the other hand, implementation of the administrative procedures has often become a source of local government income (*PAD-Pendapatan Asli Daerah*-Local Government Revenues). The second implication is that inconsistencies and contradictions between different regulations have resulted in confusion among companies and businesses, causing uncertainties and risks. These have to be borne by the company, particularly if the company wants to initiate a partnership scheme.

Compared to the business-as-usual approach of developing plantations under the HTI Programme, initiating and implementing partnership schemes requires additional overheads and transaction costs. For example, the procedures required in verifying the legal status of the community's land, which are important as the pre-condition for initiating partnership schemes and later in securing the permits for harvesting and transporting timber, impose substantial transaction costs. However, these costs could be lower than the likely risks arising from having the concession areas open to conflict and so preventing companies from managing their concession areas productively in developing acacia plantations. Still, there are unnecessary challenges, since the MoF has not been very sensitive to the favourable conditions that could enhance the competitiveness of tree-growing under the partnership scheme. From the case study analysis, this has caused a low competitive advantage to acacia plantations, compared to alternative land use, such as oil palm or rubber plantations, or agricultural crops.

Business insecurity has increased through companies changing the terms of the partnership scheme from a long-term contract to a one-rotation contract. From the companies' perspective, having a one-rotation partnership contract is a strategy to anticipate business insecurity due to the vulnerable status of community lands inside concessions. However, having a one-rotation based contract exposes the company to more risks of the land and the rights to shared benefits under partnership being sold by an individual farmer or a member of the cooperative, despite being inside state forests and bound by a contractual agreement. Established acacia plantations in partnership areas have increased the economic value of the land and attracted buyers. The sale of land is possible due to the lack of a legal framework applying to partnership schemes (i.e. Type 2 and Type 3 partnership schemes—See Section 5.2.3 for a description of these types). Laws cannot be enforced in response to violations of a contract, since there is no law or regulation that can be used as a reference.

Company foci underlying the institutional and management arrangements define the commercial feasibility of the scheme. The foci of company institutional and management arrangements in the schemes are quite dynamic, reflecting the most feasible arrangements for ensuring that the company's commercial objectives can be met. For example, the previous management of the FI Scheme under Stora Enso emphasised more social objectives than commercial objectives, which was in turn reflected in the institutional and management arrangements. This initial focus on social objectives, which the company believed was necessary to end conflicts and establish partnerships with communities, caused plantation management to become financially unfeasible. In the WKS case, the company has seen the opportunities for increasing the commercial feasibility of the scheme by developing partnership plantations outside state forests.

Companies have to balance out the trade-offs between priorities at different stages of the partnership scheme development. For example, the balance between social objectives (e.g. solving the conflicts and establishing good relations with local communities) and a company's commercial objectives is likely to change over time. In the case of FI, at the beginning, the company had to focus on social objectives, before it could emphasise commercial objectives by setting a higher productivity target for acacia production. In the case of WKS, to increase the commercial viability of the scheme the company has tried to manage its transaction costs by providing incentive packages and focussing on less disputed lands.

For cost-effective investment in institutional and management arrangements, the company has to consider the availability of local livelihood alternatives, so that the extent of the commercial focus can be determined to define what needs to be included in the partnership contract. The company has to consider carefully the existing livelihood options of community partners and to design incentive schemes that are adequate to attract prospective community partners but that are not unnecessarily generous.

Because community partners' lands included in plantation development are geographically scattered, a clear strategy is required for cost-effective and efficient management, but it has to be based on mutually beneficial principles. FI applies uniform transportation costs in all areas, which has caused management to become unfeasible at distances of more than 100 km. Other companies, such as WKS, have differentiated timber prices, which decrease according to distance, as a strategy to compensate for the increasing transportation costs.

There are indirect benefits to other parties from acacia development under partnership schemes, not only direct benefits to the community partners and the company. While these have contributed to the high transaction costs, they have also allowed financial benefits to be shared more widely. There are also benefits coming from the payment of the *PSDH-Provisi Sumber Daya Hutan* (forest resources provision) to the central government (i.e. MoF), which will eventually be allocated to provincial and district governments, and from the payment of direct fees to district governments, including the collection of informal 'fees', for example by the local police office for providing security protection for the whole operation.

Policies to simplify the procedures for developing plantations under partnership schemes both inside and outside state forest are required. Developing acacia plantations under partnership schemes is more complicated than the business-as-usual mode of developing plantations under the HTI scheme, in which the company manages its own plantations. Different cost proportions under partnership schemes implemented by FI and WKS reflect the differences in the nature of institutional and management foci when compared with the HTI development. Overall, in relation to the partnership schemes implemented by WKS and FI, additional overhead costs borne by the schemes include indirect overhead costs, for example the cost of negotiation processes, conflict resolution and forest protection. Conflict resolution is an important part of the land acquisition processes under the partnership scheme. The other main important cost component under the partnership scheme in comparison to HTI management is the allocated funding to cover the transaction costs; these may account for up to 29% of total costs, such as in the case of FI. Transaction costs in this scheme mainly capture the costs of the processes in setting up the institutional arrangements and setting up the contractual agreement.

In the concluding remarks for this chapter, it can be highlighted that, although there are a series of challenges, there are promising opportunities for the community-company partnership scheme to be enhanced as one of the small-scale commercial tree-growing strategies to produce timber inside state forests and at the same time enhance the local community livelihoods. In the next chapter, Chapter 6, the opportunities and challenges are discussed in comparison to the community tree-growing strategy discussed in Chapter 4. Further, the two strategies will be analysed by looking at their potential timber contribution to meet the wood gaps in Indonesia.

plantations under partnership schemes [illegible]
mode in developing plantations under [illegible]
manages its own plantations. Different [illegible]
implemented by [illegible] and WKS noted the diff[illegible]
management fee when compared with the [illegible]
the partnership schemes implemented by WKS [illegible]
by the schemes include indirect overhead costs, for example, the costs of [illegible]
processes, conflict resolution and forest protection. The [illegible]
part of the land acquisition processes under the partnership, however, [illegible]
important cost component under the partnership scheme is [illegible]
management is the allocated funding to cover the management costs [illegible]
for up to 29% of total costs, such as in the case of [illegible]. [illegible]
mainly capture the costs of the processes in setting up the institutional arrangements
and setting up the contract arrangements.

In the concluding remarks for this chapter, it can be highlighted that, although there
are a series of challenges, there are promising opportunities for the [illegible]
company partnership scheme to be enhanced as one of the smallholder tree
growing strategies to produce timber inside state forests and at the same time [illegible]
the local community livelihoods. In the next chapter, Chapter 6, the [illegible]
challenges are discussed in comparison to the community tree growing [illegible]
discussed in Chapter 4 [illegible]
potential [illegible]

Chapter 6. Conditions for small-scale commercial tree growing inside state forests to be managed feasibly and to be commercially competitive

6.1. Introduction

This chapter presents a discussion of the relative advantages of community tree-growing (presented in Chapter 4) and community-company partnership schemes (presented in Chapter 5), based on the results of the analysis of their performance against criteria discussed in Section 6.2. Next, the relative advantages from the analysis inform the design and implementation of policies to promote small-scale commercial tree-growing in Indonesia, as presented in Section 6.3. Specifically, improved policy and economic incentives are proposed to improve the competitiveness of small-scale tree-growing strategies. The potential impacts of these improved scenarios are further discussed in Chapter 7, which presents the scenario of timber production from small-scale tree-growing inside state forests, particularly in complementing the current wood production strategies in Indonesia.

6.2. Relative advantages of community tree-growing and community-company partnership schemes

The discussion on the relative advantages of the two schemes is organised as follows: driving factors and general characteristics (Section 6.2.1); institutional arrangements and policy setting in the state-nested system (Section 6.2.2); and opportunities and challenges for ensuring optimum allocation of resources within the public domain under the two strategies as implemented in case studied areas (Section 6.2.3). Section 6.2.3 covers issues of: tenurial arrangements (Section 6.2.3.1); factors affecting feasibility and benefits received by communities (Section 6.2.3.2); factors that cause insecurity in the business of developing small-scale timber plantations (Section 6.2.3.3); as well as important factors for communities to develop small-scale plantations independently (Section 6.2.3.4).

6.2.1. Driving factors and general characteristics

As indicated in Chapters 4 and 5, both schemes were initiated primarily in response to the need to reinforce state property status in forest areas suffering from encroachment and intensive illegal logging. Specifically, the community tree-growing scheme was initiated mainly in response to the need for handling the repeated problems of uncontrolled access to state forests (Table 6-1). Company initiatives under the community-company partnership scheme developed inside state forests were driven mainly by the urgency to resolve conflicts over land claimed by both local communities and outsiders, as is also the case of the partnership scheme in Java initiated by a state-owned company as discussed, for example, in Fujiwara *et al.* (2012). Initiatives driven purely by the company's economic objective to expand its lands for planting acacia would instead be observed in the partnership initiatives developed on privately owned lands belonging to community members. Even though this thesis focuses on tree-growing inside state forests, the discussion regarding the implementation of partnership on privately owned land helps provide a better understanding of the company's strategy, and particularly how it differs from developing a partnership scheme inside state forests. It also illuminates differences in the community's motivation to join the schemes.

From the perspective of the community members involved, the motivation to join the community tree-growing scheme was mainly to obtain access to practise inter-cropping inside state forests, and to maintain their expectation of receiving a share of benefits from timber growing. Community members' motivations to join a partnership arrangement with a company is primarily to utilise their unproductive land and to gain recognition of rights to their claimed land inside state forests. For community members owning land outside state forests, their motivation has been mainly to gain economic benefits from tree-growing on their spare land.

Table 6-1. **General characteristics and driving factors: community tree-growing and community-company partnership schemes**

Aspects	Government programme: community tree-growing schemes	Company programme: community-company partnership schemes	
		Inside state forests	Privately owned land
1. Land status	State property and no traditional community rights are recognised	State property granted to concessionaires and traditional community rights are recognised	Individually owned lands with different status
2. The dynamics of tenurial conditions	Recurring problems of open access on state property due to under-managed state forests	Claimed lands inside state forests—idle lands/unproductive	No major conflicts in relation to land status
3. Motivation of the initiator for involving community members in tree-growing	Government: enforcing the state-property status by involving local community in guarding it from open access, illegal logging and forest encroachment	Company: resolving conflicts over land to use it for timber plantations	Company: expanding lands (outside concession areas/state forests) for timber plantations
4. Motivation of tree growers	Access to state forests and expected timber benefits	Resolving conflicts & economic motivation to utilise unproductive lands	Economic motivation to utilise unproductive lands
5. Management focus and arrangements	Forest rehabilitation through mass replanting by involving community members and providing access for inter-cropping as the incentive	Pulp-based timber plantation development by involving community members and providing financial and other incentives	Pulp-based timber plantation development, by involving community members and providing shared benefits from timber as an incentive
6. Commercial focus	No commercial objective	Commercially focussed by securing access to land	Purely commercial

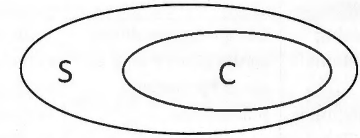
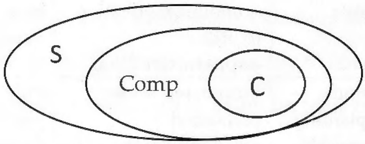
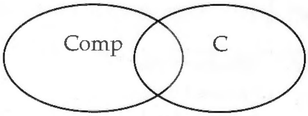
6.2.2. Institutional arrangements and policy setting

The two main discussion points in this section are the collaborative arrangements (Section 6.2.2.1) and social capital (Section 6.2.2.2) under the state-nested system. Under the current policy setting, a collaborative approach is the main institutional arrangement. As highlighted in the literature review in Chapter 2, formal collaborative management inside state forests is referred to as a state-nested system, in which the state is the *de facto* holder of all the legal rights (Carlsson and Berkes, 2005).

6.2.2.1. Collaborative arrangement under the state-nested system

As in the case of the community tree-growing scheme, community rights are assigned inside forests, but the community does not have a significant degree of independence in managing the resources, even though the tree-grower cooperative as the organisational unit was initially formed by the state through the district governments (Table 6-2).

Table 6-2. Diagrammatic description of collaborative arrangements under state-nested system

	Collaborative arrangements	Relevant schemes
1.	 A pure state-nested system, with the community rights granted directly by the state	Community tree-growing scheme inside state forests in Sumbawa and Bima:
2.	 Company is part of a state-nested system and community is one layer down, embedded in rights granted for the company	Community-company partnership scheme inside state forests in Jambi and Sanggau
3.	 An exchange system between company and community	Community-company partnership scheme outside state forests in Jambi

Notes: S-State, Comp-Company, and C-Community.
Sources: Analysed from case studies using the framework adapted from Carlsson and Berkes (2005).

Under the community-company partnership scheme, community involvement is embedded in the company rights granted by the state, even though in many cases the community has been there longer and often holds the traditional rights to the forest resources. Unlike the nature of community rights under the community tree-growing scheme, the company has a significant degree of independence in managing the resources and to initiate the partnership with the community that claims the land inside the concessions. However, there are high overhead and transaction costs (as discussed in Section 5.5 of Chapter 5). Overall, the state-nested system tends to stimulate high transaction costs (further discussed in Section 6.2.3.3), especially if the procedures to get the rights are complex, such as under the community tree-growing scheme.

It is important to mention that, as discussed in Sections 4.2 and 4.3 of Chapter 4, the local communities were not involved in the initial management of state forests. There were significant estimated financial losses at both government and household levels as a result. For example, from the analysis based on community tree-growing scheme case studies (see Box 6-1), the estimated total financial benefits (up to Rp 85.9 billion or AUD 10 million) and annual benefits received from timber per household (up to Rp 9.3 million or AUD 1,101) indicate that significant potential benefits were lost due to losses from the standing timber stock following illegal logging and forest encroachment. These losses could have been prevented if communities had been involved much earlier.

By developing partnerships, the company also aimed to establish a social buffer zone to protect its own plantations (Nawir and ComForLink, 2007). This is particularly to secure its concession areas against other investors looking for land, such as for oil palm plantations. The level of security of company access is even greater under a partnership arrangement developed on privately owned lands outside state forests. From the government's perspective, a partnership scheme developed by companies inside their concessions has been seen as a suitable and workable complement to the *HTI* Programme and as a mechanism to transfer the benefits from large-scale plantation development to the local community, as also observed by Fujiwara *et al.* (2012) in Java and Schneck (2009) in Sintang, West Kalimantan.

Under the state-nested system, formal endorsement from the MoF is required for both schemes, and particularly to ensure that benefits from timber are shared with the local community involved. Further, MoF endorsement in the form of a regulatory framework for partnership schemes is important to the company to provide a legal basis for initiating contracts with community partners.

To enhance the implementation of both schemes towards commercial small-scale tree-growing management, policy frameworks at national and district levels need to be further refined. This is because both schemes are part of the state-nested system and the progress in further development relies on how responsive the government is by providing enabling policy frameworks (see Section 6.3 for further discussion of improved frameworks). Ideally, the collaborative institutional arrangements between the two or more parties involved should be based on an exchange system (collaborative arrangement type 3 in Table 6-2), such as in the case of the partnership scheme implemented on privately owned land. This could include the exchange of information, goods and services, or at least a joint organisation of the community tree-growing scheme. Furthermore, social capital can be generated under these arrangements, as further discussed in Section 6.2.2.2.

Box 6-1. The costs of delaying community involvement in community tree-growing schemes in Sumbawa and Bima

Estimated financial benefit[a] lost was calculated as the difference between the existing and full standing stock conditions. The current standing stock scenario refers to current conditions after forest encroachment and illegal logging. Full standing stock scenario refers to initial standing stock, assuming these could be maintained if the community was involved earlier in managing state forests. The results show an estimated financial loss per ha to the government allocated budget in Sumbawa of Rp 193 million/ha (AUD 22,862/ha), which is higher than the estimated loss in Bima of Rp 73 million/ha (AUD 8,641/ha).

The income from inter-cropping in Bima under the full standing stock scenario is lower, since the lands have to be displaced by timber. Therefore, there is a negative potential income, since the income from inter-cropping decreases from Rp 2.6 million (307) to Rp 2.4 million (AUD 289). This was not the case for Sumbawa, since there is more available land resulting from tree removal due to illegal logging.

Estimated financial benefit losses	Community tree-growing schemes		Average
	Sumbawa	Bima	
a. In total benefits			
a.1. Rp million	85,854	2,876	44,365
a.2. AUD	10,181,901	341,109	5,261,505
b. In benefits per ha			
a.1. Rp million	193	73	133
a.2. AUD	22,862	8,641	15,752
Estimated annual net income losses	**Community tree-growing schemes**		**Average**
	Sumbawa	**Bima**	
1. Total annual net income			
Rp/household	14,039,470	8,324,159	11,181,814
AUD/household	1,665	987	1,326
2. Income from timber			
Rp/household	9,286,338	8,476,789	8,881,564
AUD/household	1,101	1,005	1,053
3. Income from intercropping			
Rp/household	4,753,132	(152,630)	2,300,251
AUD/household	564	(18)	273

File: Compilation Sumbawa & Bima.xls -Full standing stocks (3)

Notes:
( ): Negative value
a. Annual value was estimated based on EAE (Equal Annual Equivalent), see Chapter 3 for further discussion on methodology.
Sources: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2005–2007) and secondary sources (BPS, 1994–2009; BPS Bima, 2010; BPS Sumbawa, 2008).

6.2.2.2. Social capital under the state-nested system

As discussed in Section 2.4.1 of Chapter 2, social capital is referred to as the set of social relationships on which people can draw to expand livelihood options, such as under collaborative management (Carney *et al.*, 1999; DFID, 1999; Mayers, 2000; Arnold, 2001b; Warner, 2002; Angelsen and Wunder, 2003; Nawir *et al.*, 2007c). The collaborative institutional arrangement between the FDA and the local community under community tree-growing schemes in Sumbawa and Bima has generated social capital leading to access for community tree-growing inside state forests (see Section 6.2.2.2.1). On the other hand, social capital generated from community-company partnership arrangements in Jambi and Sanggau has led beyond just recognising community rights, as it has opened access to the communities to direct benefits from timber plantation development inside concessions (see Section 6.2.2.2.2). A central question for the expansion of both schemes is how this social capital can be managed effectively to generate other important capital for enhancing commercially feasible tree-growing (Section 6.2.2.2.3).

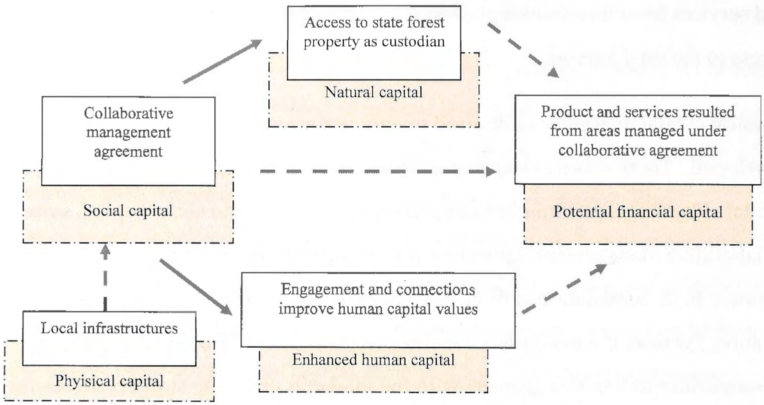
6.2.2.2.1. *Community tree-growing scheme: social capital leading to access inside state forests*

In Sumbawa, the collaborative arrangements under the formal setting of *Perda PSDHBM* provided the local community with access to state forests as the natural capital, while in Bima it was driven by a local community informal initiative (Figure 6-1). However, there were multiple impacts from these two arrangements. The impacts from the existing social capital included: clearer custodianship, prevention of 'free rider' problems, resolution of conflicts, and guaranteed secure access for certain forest user groups, such as landless community members.

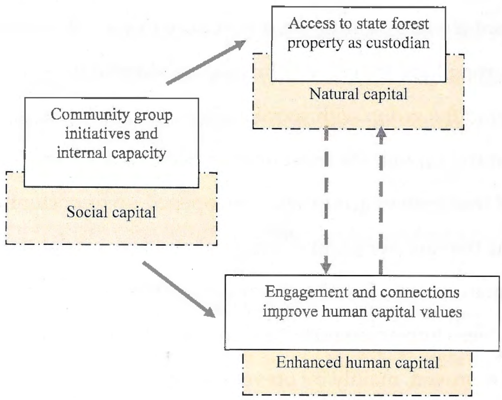
In the beginning, the social capital also stimulated the enhancement of human capital values, mainly because the collaborative management arrangement provided opportunities for active involvement in the participatory processes of mapping, training and setting up the institutional arrangement. However, there was no current financial capital accruing from the community investing in tree-growing. It was expected that access to natural capital and enhanced human capital could contribute to the accumulation of financial capital by ensuring improved conditions for products and services from forests, except from timber because the community does not have access to the final harvest.

Physical capital in Sumbawa referred mainly to the local government infrastructure developed. There was no clear impact from physical capital on the other types of capital. Physical capital might have given an added value to social capital, since the collaborative management agreement was set up with the FDA as the main community partner. Both Sumbawa and Bima have been disadvantaged by their geographical location, far from the main timber market on Java. Therefore, having good infrastructure to link tree growers with the market is crucial to support successful community tree-growing schemes.

The most important characteristic of the community forestry management in Bima District was the strong local initiative. The existing internal tree-grower group's capacity empowered the group with social capital and helped create custodial rights to state forests as natural capital. As mentioned in Sections 4.2.2 and 4.3.2 in Chapter 4, the recognition of tree-grower group activities opened up opportunities for training and enhancing the tree-grower group's technical and managerial skills, which enhanced the human capital. Eventually, to some extent this improved the management practices implemented by the group members and the overall conditions of the areas also improved, mainly by preventing continuing disturbances from illegal farming and grazing. However, due to the lack of an overarching policy framework at the district level, these rights could not be secured beyond the period of the project, so there were no opportunities to accumulate financial capital.



a. The social capital leading to access to state forests, human and financial capitals enhanced (Sumbawa case)



b. The social capital leading to access to state forests and human capital enhanced (Bima case)

Figure 6-1. Social capital leading to access to state forest and other capitals enhanced

6.2.2.2.2. Community-company partnership schemes: social capital leading to access to, and direct benefits from, timber plantation concessions

The partnership arrangements between the local community and the company in the two case studies have been identified as bringing together different capital owned by these two parties. The company brings the social capital of having the rights as a concession holder to develop an acacia plantation as part of the *HTI* Programme, together with its financial capital to cover the costs. The community brings claimed or owned land inside and outside state forests as the natural capital to be managed under partnership arrangements.

The partnership arrangements have created social capital with multiple different impacts on both parties (Figure 6-2). The social capital under partnership arrangements has provided the company with legitimate access to claimed areas and/or additional plantation areas on privately owned community land. The other impacts on the company from the existing social capital include: preventing 'free rider' problems of having multi-layered claimants over the same piece of land, and guaranteed secure access for harvesting acacia at the end of rotation.

For community partners, the social capital comes from having a management partnership and enhanced human and financial capital. Enhanced human capital comes from institutional and management arrangements made by the company as part of the initiation processes, which in the case of FI included training programmes. Enhanced financial capital, for example in the case of FI, came from the company which provided financial incentives as part of the incentive package at the beginning of the partnership arrangements. As part of its investment in acacia plantation development, the company also built the road infrastructure, as part of which there are significant services for the community, particularly in linking up with the market for their agricultural production.

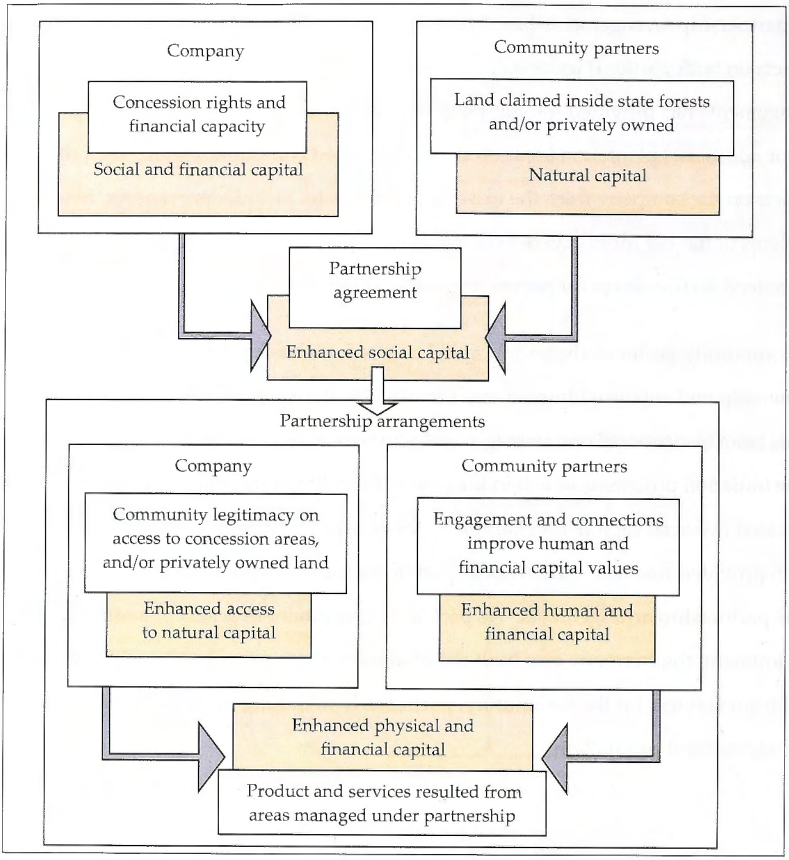


Figure 6-2. Social capital under partnership schemes

6.2.2.2.3. *Can social capital effectively enhance other capital to increase the feasibility and commercial competitiveness of small-scale tree growing?*

There are at least seven challenges for social capital to be effective in generating other types of capital to enhance small-scale commercial tree-growing (Table 6-3). These include: (1) dependency on external facilitation, (2) exclusive rights, (3) the existence of an association of tree growers/community members, (4) norms of exclusion, (5) level of trust, (6) information sharing and exchange, and (7) common rules, norms and sanctions. The extent of these challenges are different for community tree-growing compared to the partnership schemes.

Despite the fact that initiatives mainly responded to the community need for access to state forests, the dependency of the community on external facilitation in community tree-growing schemes has been very high. In particular, facilitation processes were initiated by the FDA, local governments and other external agencies, such as NGOs. This is quite common in Indonesia, as also observed by Schneck (2009); Fujiwara *et al.* (2012); and Harada and Wiyono (2014). To what extent social capital can be utilised to be more effective depends on the efforts put in by these external agencies. Because of strong externally driven facilitation, the cooperative and/or tree-grower group have not been very effective in performing and executing planned activities. This is mainly due to their limited ability to generate financial capital as well as the low level of mutual trust between all stakeholders involved. These need to be improved if the schemes are to be sustainable. For example, this can be done by having more transparent information sharing and exchange, and creating common rules, norms and sanctions that are respected by all stakeholders, including other villagers outside the designated areas. The cooperative and/or tree-grower groups need to have the right or authority to exclude outsiders and to be supported in this by the law and law enforcement. However, since the rights were granted only to members of the cooperative and/or tree-grower group, there needs to be a mechanism to minimise potential conflicts with those who have not been given the same opportunities and rights due to social gaps. An appropriate mechanism could be mutually agreed and negotiated with the neighbouring community members.

Table 6-3. **Challenges for social capital to be effectively managed in enhancing other capital**

Disadvantages conditions [a]	Schemes	
	Community tree-growing	**Partnership**
1. Dependency to external facilitation	Highly depending on FDA, local government, and other external agencies	Company has a very strong role in determining all of the conditions for participating and benefit-sharing mechanism
2. The existence of association of tree growers/ community members	Limited financial capital preventing the cooperative/tree grower group to perform and executing planned activities	Limited roles of cooperatives/ tree grower groups in decision making
3. Norms of exclusion	Exclusion rights that are not backed up with legal law enforcement rights	Embedded within concession rights; norms of exclusion often has not been very effective in dealing with the claims from other company investors
4. Level of trust	Levels of trust between community members and FDA/local government are yet to be improved	Fragile level of trust between company and community partners
5. Information sharing and exchanges	Limited information sharing and exchanges between community and FDA/local government	Limited information sharing and exchanges between company and community partners, as well as with FDA/local government
6. Common rules, norms and sanctions	They were top-down driven and have not been mutually-respected by other stakeholders to be effectively implemented	The significant one was economically driven, so company applies different term of conditions depending on priority at the time
7. Exclusiveness of rights	Provided only to members of cooperative and/or tree grower groups	Provided only to land owners joining the schemes excluding those who are landless

Notes: a. Condition aspects are based on Pretty and Ward (2001) and Cleaver (2005) as discussed in Section 2.4.1.2 of Chapter 2.

Under partnership schemes, the community has had a high dependency on external facilitation initiated by the company, and this might cause a weak sense of ownership by community partners. The effective use of social capital depends not only on the efforts of the company, but also on how attractive the company's initiatives are to community partners. To some extent, the effectiveness of the community partners' responses depends on how effectively they organise themselves in the cooperative and/or tree-grower group, and the level of mutual trust established with the company.

As discussed in Chapter 5, as the partnership schemes were initiated as a mechanism to resolve conflicts, building mutual trust has been quite challenging. Further, the trust building processes have not been fully supported by transparent information sharing and exchange between the partners. Common rules, norms and sanctions are limited, and the most significant have been of economic importance and set by the company. This was mainly during the process of buying the harvested timber from the partnership areas at the end of a rotation. The companies apply varied conditions to different growers, such as delaying the harvesting beyond the initial agreed time frame for some partners. However, in the case of community tree-growing schemes, there are potential conflicts (due to social differences) between the community landowners and community members who are landless and do not have similar opportunities to engage in tree-growing schemes. All of these challenges have reduced the effectiveness of social capital in enhancing other types of capital for small-scale commercial tree-growing. Further, there are external conditions that have to be taken into account as well and these are further discussed in the next Section 6.2.3.

However, enhancing social capital, for example by strengthening growers associations and networking, can be effective not only for stimulating other capital, such as financial capital, but also in reducing transaction costs (Cosyns *et al.*, 2013; Ruseva *et al.*, 2014), as well allowing their small-scale management to be certified under a group forest certification system (Auer, 2012). Therefore, as discussed in Section 6.3, having an effective grower association is one of the key aspects in developing frameworks towards feasible and commercially competitive small-scale tree-growing management.

6.2.3. Opportunities and challenges in ensuring socioeconomically feasible and commercially oriented tree-growing schemes inside state forests

Opportunities and challenges are discussed in this section in the following order: tenurial arrangements under the state-nested system (Section 6.2.3.1); factors affecting the feasibility and benefits received by community members and other main stakeholders (Section 6.2.3.2); factors affecting business insecurity (Section 6.2.3.3) and relating to independent community plantations (Section 6.2.3.4).

6.2.3.1. Tenurial arrangements under the state-nested system

Under the first and second headings, one of the most important aspects underlying robust and competitive management as well as secure and fair market development and access is the overarching policy framework for tenurial arrangements. As discussed in Chapter 2 (Section 2.4.4.1), the property rights and tenure regime defines the efficiency of the use of a resource as well as the distribution of benefits generated for all parties involved (Pearse, 1990; Perman *et al.*, 1996). The inter-relations between property rights and tenure in the regime are crucial in ensuring that the local community receives benefits from the timber harvested (Coase, 1960; Place *et al.*, 2004; Meinzen-Dick and Gregorio, 2004; Meinzen-Dick *et al.*, 2006; Hlaing *et al.*, 2013; Albano and Takeda, 2014). Furthermore, the existing property rights and tenure regime stimulates individual and collective action in responding to economic and market opportunities for sustainable livelihoods (Arnold, 1998; Ostrom, 2000; FAO, 2002; Meinzen-Dick and Gregorio, 2004; Meinzen-Dick *et al.*, 2006; Albano and Takeda, 2014).

The property rights and their associated five dimensions have implications for the efficiency of resource use and the distribution of benefits. Discussion of the two schemes is organised below under five dimensions of property rights, which are: (i) the comprehensiveness, (ii) duration, (iii) benefits conferred, (iv) transferability, and (v) exclusiveness of forest tenure (Table 6-4).

First, community access on state property is better under partnership schemes, since the community is granted access to state forests under the company's formal de jure property rights to the concession areas. The community then receives recognition of their de facto property rights inside state forests, but they have to give up their comprehensive access by allowing the company to utilise their lands for timber.

Second, the duration of the management rights is longer in the case of a partnership arrangement, in line with the terms for *HTIs* right, than it is for the community tree-growing scheme. The duration of the agreement, set out in the community tree-growing scheme of 35 years, provides enough opportunities for teak to be managed for at least one rotation. The companies usually set a contractual partnership agreement to continue for the same duration as the concession period granted by the MoF[23] to secure their access to community partners' lands. Bound by the contract, the community partners have limited their business options and so would normally be unable to shift to other economic alternatives until the end of the contract. However, there have been cases in which the community partners have sold the lands and cut down the existing acacia trees before the contract had finished due to more interesting offers or disappointment with companies' commitments (Nawir *et al.*, 2003b).

Table 6-4. The dimensions of property rights and their economic implications

The dimensions of property rights	Schemes	
	Community tree-growing	**Community-company partnership**
1. Comprehensiveness (access)	Limited by short-term duration of management rights, particularly for harvesting rights on existing standing stock planted	Offers community members a formal recognition on their de facto property rights, and for companies to regain comprehensive access as part of their concession rights
2. Duration	Secure only for one rotation of timber management (i.e. teak); long-term right is subject of reassessment by MoF	As long as concession period granted by the MoF; increasingly one-rotation contract (5–7 years) is applied by companies
3. Benefits retrieved (withdrawal rights)	Short-term benefits from inter-cropping with agricultural crops	The sole right to retrieve the benefits from acacia wood is in the hands of the company and shared benefits should be provided to the community
4. Transferability (management)	Limited option due to the forests being classified as state forests	Very limited for both parties; higher investment risks for community partners
5. Exclusiveness	Exclusiveness of community rights can be maintained with risks due to lack of norms and sanctions respected by outsiders	Company can ensure its exclusive access over concession area; community partners must give up their exclusiveness based on de facto rights

[23] Under the latest government regulation (*Peraturan Pemerintah-PP* No. 6) that is still applied today, *HTI* concession can be granted up to 100 years (GoI, 2007).

Third, benefits are retrieved under withdrawal rights. Under community tree-growing schemes, for the time being, community members are quite happy with the benefits from inter-cropping with agricultural crops. However, as discussed in Section 4.2.1.3 of Chapter 4, the community's commitment has weakened due to the lengthy decision-making processes, taken between the FDA at district level and the MoF at central level, on whether the community can be granted shared benefits from the potential harvested timber. On the other hand, under the partnership scheme the sole rights to retrieve the benefits from acacia wood are in the hands of the company, and shared benefits provided to the community partners follow the contractual agreement. Having a fair and equitable benefit-sharing agreement is the key to successful small-scale tree-growing management (Nawir and Santoso, 2005).

Four, management transferability into alternative options is very limited, both under the community tree-growing and partnership schemes, due to state forest status. For the company this was already part of its investment plan; whilst for community partners, by joining the partnership scheme for a long term, they have limited their options to change their decision in favour of using their lands for other investment alternatives.

Five, exclusiveness under partnership schemes works better than under community tree-growing schemes for the same reasons mentioned in point 1 (comprehensiveness). Under the partnership arrangements, the company can ensure its exclusive access over the concession area, particularly to land claimed by the community. Community partners must give up their exclusive privileges under the de facto rights. The tree-grower group, as the main holder of the rights under the community tree-growing scheme, can maintain exclusive rights up to a certain level. Risks are high, particularly from encroachments by outsiders who do not respect the norms and sanctions applied.

Overviewing the five aspects of the economic importance of tenurial arrangements in this section, it can be concluded that the common property arrangements provide promising opportunities for initiating community tree-growing schemes. However, at the moment, the results are not adequate to ensure the commercial feasibility of the initiatives and the allocation of forestry resources to the most beneficial socioeconomic considerations. Frameworks of the proposed policy and economic incentives for the socioeconomic feasibility and commercial competitiveness of the two schemes are further discussed in Section 6.3.

6.2.3.2. Factors affecting the feasibility and benefits received

Summarising from Chapters 4 (Section 4.4) and 5 (Section 5.5), the current management of the community tree-growing scheme is less feasible than the partnership schemes (Box 6-2), mainly because of the low standing stock, despite the planting of the commercially attractive timber species of teak.

Overall, the financial feasibility and commercial possibilities of the current management of the two schemes are characterised by different determining factors (Table 6-5). There are at least five important factors: (1) determining management characteristics, (2) nature of investment, (3) main factors affecting commercial feasibility, (4) role of market incentives for the community in deciding alternative investment options, and (5) factors in maintaining long-term sustainability.

First, the determining management characteristics under community tree-growing schemes are mainly the household land ownership inside and outside state forests, and its allocated portion to timber and inter-cropping with agricultural crops. On the other hand, for the community-company partnership scheme, the financial and profitability possibilities are characterised by the institutional and management arrangements initiated by the company as part of the scheme, such as the period of the contract.

Second, as discussed in Chapters 4 and 5, investment in the two schemes is dependent primarily on external assistance and funding provided by government (for the community tree-growing scheme) and by private companies (for the community-company partnership scheme).

Box 6-2. Comparison of financial net benefit under community tree-growing and partnership schemes

Community tree-growing schemes have an average negative benefit value of Rp 1,529 million (AUD 181,383) and the partnership schemes have an average positive benefit value of Rp 210 million (AUD 24,952). The IRR value is higher for community tree-growing schemes at 12% with higher NBIR at 3.13, and lower than discount rate at 7% for the partnership schemes with less than 1 NBIR at 0.27.

The estimated benefits are quite sensitive to the timber productivity per ha that is currently low compared to the standard following proper silvicultural practice in both schemes. Taking into account that the productivity level can be restored to the standard level (full standing stock), the benefits under the two schemes become feasible and result in positive values (Rp 43,836 million or AUD 142 for community tree-growing schemes, and Rp 292 million or AUD 34,625 for partnership schemes). However, at higher benefits, the community tree-growing schemes become too expensive to be funded with IRR 20%, despite significantly higher NBIR at 28.03.

Management	Net Present Value (NPV) of tree-growing schemes			
	Community tree-growing		Partnership	
	Rp (million)	AUD	Rp (million)	AUD
1. Current condition				
Total benefits	(1,529)	(181,383)	(210)	(24,952)
Value per ha	9	1,049	(2)	(222)
IRR	12%		7%	
NBIR	3.13		0.27	
2. Improved condition				
Total benefits	42,836	5,080,122	292	34,625
Value per ha	142	16,800	87	97
IRR	20%		10%	
NBIR	28.03		1.37	

File:\Thesis\Rev Compilation Chapters\Compilation of economic analysis 2 schemes - Financial benefits

Notes:
( ): Negative value
a. Current condition based on current productivity per ha and standing stock
b. Improved condition based on the number of standing stock following the appropriate silvicultural practices.

Sources: Analysed from: data collected by CIFOR and WWF Indonesia Nusa Tenggara (2005-2007); data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); BPS (1994-2009); BPS Sumbawa (2008); BPS Bima (2010); BPS Jambi (2010) and BPS Kalimantan Barat (2010).

Table 6-5. Factors affecting feasibility and profitability

Factors	Schemes	
	Community tree-growing	Partnership
1. Determining management characteristics	Greater dependency on forest lands due to limited lands outside state forests for agricultural crops as the main priority	Excessive idle lands due to limited family labour and financial capacity. Fluid commitment in maintaining their lands for investment in timber
2. Nature of investment	Highly invested government initiatives with large areas of forest rehabilitation on degraded forest areas through massive replanting	Company concession investment in pulp-based timber plantation development
3. Main factors affecting commercial feasibility	Household land ownership inside and outside state forests, and its allocated portion for timber and inter-cropping with agricultural crops	The institutional and management arrangements initiated by the company
4. Role of market incentives for community in deciding alternative investment options	Market incentives are very strong in deciding types of cash crops to be invested in, in the short-term.	Market is quite limited, so there are no market incentives directly received by smallholders
5. Important factors in maintaining the sustainability	Clear tangible shared benefits from timber.	Able to compete with alternative investment options for higher economic returns (opportunity costs).

Third, the main factors affecting commercial feasibility under community tree-growing schemes are the limited availability of lands outside state forests for agricultural crops, which is a strong motivation for the community to become involved in the schemes. This greater dependency on forest lands has a positive impact in maintaining community commitment, particularly in guarding the state forests against illegal logging and forest encroachment. Therefore, the local livelihood strategy as affected by land ownership characteristics has to be taken into account in designing the institutional and management arrangements of a cost-effective tree-growing scheme. As can be seen in Box 6-3, the average area of land households own and allocate to partnership schemes is about 10 times higher than the land households own and allocate to the community tree-growing schemes. As discussed in Section 5.5 (Chapter

5), land used for tree-growing in partnership schemes is mostly land kept idle as part of household management strategy.

Understanding households' land management strategy is important, particularly when the company has to decide what needs to be included in or excluded from the incentive package of a partnership scheme. Such understanding would lead to effective budgeting through a better targeted incentive package. Further, due to the characteristics of community partners' lands being scattered throughout the plantation development area, better strategies are required to develop efficient and cost-effective operational management that also delivers mutual benefits (further discussed in Section 6.3.2).

Fourth, the role of market incentives is a very strong driver for the community when deciding investment options based on cash crops in the short-term under community tree-growing schemes. On the other hand, despite the existence of an open timber market, there are no clear direct market incentives for timber received by smallholders at this point. In addition, as discussed in Section 2.4.3.1, the long rotation period prevents small-scale operations from being able to respond immediately to price signals in supplying the market (Pearse, 1990; Klemperer, 1996). This has also been the case for partnership schemes, where there are no direct market incentives for smallholders since the company is the only buyer under the monopoly market. Due to the nature of timber production of fast-growing species that can be processed only for a limited range of wood-based production, such as pulp, the market is quite limited.

Fifth, the most important factor in maintaining sustainability under community tree-growing schemes is having arrangements in place to distribute clear, tangible shared benefits from timber to the community members involved. Under partnership schemes, it is important to be able to compete with alternative investment options by providing a comparable benefits option using the same land resources with shorter and higher period for economic returns (opportunity costs).

Overall, despite various challenges to improving the development of timber plantations under partnership schemes, timber growing provides promising opportunities. Inability to meet demand has caused an increase in timber prices. This would suggest that there is room for further development in timber production, both inside and outside state forests. Factors to be taken into account are further discussed in Section 6.3.

Box 6-3. Average land allocations for community members joining community tree-growing and community-company partnership schemes

The table below shows the average land allocation by households for tree-growing under the two schemes. On average, in addition to land used for tree-growing, households involved in partnership schemes managed land for other crops, such as oil palm and rubber plantations, on up to 39% of their total lands. Furthermore, households involved in community tree-growing schemes allocated their own land outside state forest at higher proportion for cultivating cash or food crops, reflecting the high competition for land use outside state forests to meet households' needs. At the district level, the average area of land per household (no. 4) under the community tree-growing scheme is more than double the average area of land ownership.

Description	Tree-growing schemes	
	Community tree-growing [a]	Partnership [b]
1. Total land managed per household (ha)	2.06	15.80
2. Land managed inside state forests per household		
a. Areas (ha)	0.89	9.57
b. Proportion to total household managed areas (%)	44%	61%
3. Other household lands (ha)		
a. Areas (ha)	1.17	6.23
b. Proportion to total household managed areas (%)	56%	39%
4. Average of total land managed per household at district level (ha) [c d]	2.94	4.51

File: Compilation of economic analysis 2 schemes.xls - Land CTS & CC

Sources:
a. Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005)
b. Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009)
c. For community tree-growing schemes: BPS Sumbawa (2008) and BPS Bima (2010)
d. For community-company partnership schemes: BPS Jambi (2010) and BPS Kalimantan Barat (2010).

6.2.3.3. Risk factors affecting business security

In ensuring feasible and commercially competitive management, it is important to take into account the different factors that might result in insecure and non-sustainable business development, specifically the risk factors affecting business security. This is particularly important, considering the time lag in timber production and the demand in the short-term and long-term as discussed in Section 2.4.3 (Chapter 2) (Harrison, 2005). There are at least six risk factors that are a potential source of business insecurity for the two schemes (Table 6-6): (1) trade-offs in prioritising short-term and long-term objectives, (2) dominant cost components, (3) decisions on the management period, (4) different points-of-view of the various stakeholders regarding factors affecting the feasibility, (5) unfair benefit-sharing mechanism, and (6) undervalued intangible costs and benefits.

Firstly, it is important to consider trade-offs in the approach to prioritising in response to the dynamic changes in needs and external political and socioeconomic conditions. Failure to do so could result in unsustainable schemes. For example, under community tree-growing schemes, there should be a good balance between strategies to prevent forest encroachment and illegal logging in the short-term, and to maintain community partners' commitment in the long-term. The latter can be achieved by providing clear arrangements for shared timber benefits. Under community-company partnership schemes, at different stages of partnership scheme development, companies have to balance the trade-offs when prioritising, for example, between social objectives (e.g. solving conflicts and establishing a good relationship with the local community) and the company's commercial economic objectives.

Table 6-6. Factors affecting business insecurity

Factors	Schemes	
	Community tree-growing	Community-company partnership
1. Trade-offs in prioritising short-term and long-term objectives	Equally focused strategies by taking into account short-term and long-term priorities.	Companies have to balance the trade-offs in prioritising their scheme objectives: social objectives and timber production
2. Dominant cost components	Low cost-effectiveness of high government investment implemented in a large scale	Significant overhead and transaction costs under partnership schemes compared to business-as-usual
3. Deciding on management period	Administrative requirements potentially leading to delays in maintaining the management continuity	Shifting company management strategy from long-term contract to one-rotation based contract
4. Different points of views on factors affecting the feasibility	MoF priorities might change and different to local government/FDA priorities which could cause conflicting legislation and regulations	Community partners and company to stick to their commitments
5. Unfair benefit-sharing mechanism	No clear benefit-sharing mechanism has been set-up	Unfair and non-transparent processes in setting-up the benefit-sharing agreement
6. Undervalued intangible costs and benefits	Intangible benefits and costs are important in defining benefit-sharing, such as contribution from community partners	Acacia development under partnership schemes provides direct and indirect benefits to broader communities

Secondly, dominant cost components (discussed in Section 4.4 in Chapters 4 and Section 5.5 in Chapter 5) have been the determining factors in making tree-growing under the two schemes feasible. Therefore, these cost components should be treated carefully, since they can be the source of business insecurity in developing and implementing the schemes. Under the community tree-growing schemes, careful attention should be paid to controlling the high costs of government investment, mainly in plantation development and harvesting and transportation costs (Table 6-7). This is particularly true of those schemes that do not fit the institutional model for small-scale community tree-growing due to limited labour and management capacity. An overview of dominant cost components is also an important aspect when analysing community capacity for independently developing timber plantations (see Section 6.2.3.4 for other risk factors affecting business security).

Table 6-7. **Dominant cost components (%) under community tree-growing and partnership schemes**

Cost components	Tree-growing schemes	
	Community tree-growing	Partnership
1. Investment	4%	20%
2. Plantation development costs	34%	31%
3. Timber harvesting and transporting	34%	4%
4. Overheads [a]	12%	30%
5. Transaction costs [b]	16%	16%
Total	100%	100%

File: Compilation of economic analysis 2 schemes - Cost proportion

Notes:

a. Overhead costs: harvesting and transportation costs, *PSDH (Provisi Sumber Daya Hutan)*, and indirect overhead costs (for negotiation processes, conflict resolution and forest protection)

b. Transaction costs refer to the additional costs compared to the business-as-usual setting up *HTIs*, such as for setting-up the institutional arrangements and the contractual agreement.

Sources:

Analysed from: data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005); data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); BPS (1994-2009); BPS Sumbawa (2008); BPS Bima (2010); BPS Jambi (2010) and BPS Kalimantan Barat (2010).

Compared to the community tree-growing schemes, the dominant cost components under the community-company partnership schemes are company investment in road infrastructure (20%), plantation development costs (31%), and overhead and transaction costs (totalling 46%). To minimise the overhead and transaction costs, policies to simplify the procedures for developing plantations under the partnership scheme inside state forests are required. There is also a need to put in place an effective conflict resolution mechanism, particularly for land acquisition processes under the partnership scheme, as this currently accounts for a high proportion of transaction costs.

Thirdly, the management period is very important in tree-growing in order to ensure the timber is harvested within the management cycle. Therefore, failing to ensure consistent management from both institutional and technical perspectives could lead to low commitment from those involved and also lead to greatly reduced feasibility and sustainability. For example, under community-company partnership schemes, business insecurity can increase when there is a change in the company strategy, from long-term contracts to a one-rotation based contract. Nevertheless, having a one-rotation partnership contract is a strategy to anticipate business insecurity due to the vulnerable status of community lands inside concessions. Having a one-rotation contract increases the risk of either or both the land and the rights to shared benefits under the partnership being sold by an individual farmer or a member of the cooperative, despite the land and the trees being inside state forests and supposedly bound by a contractual agreement. An acacia plantation established in partnership increases the economic value of the land and attracts buyers (Nawir *et al.*, 2003b). The sale of land is possible due to the lack of a legal framework in partnership schemes (i.e. Type 2 and Type 3 partnership schemes, as discussed in Section 5.2.3). There is no law or regulation that can be used as a reference for law enforcement in response to violations of a contract.

Fourthly, the different points of view of the different stakeholders regarding factors affecting feasibility might be a significant potential source of high risk for tree-growing under the two schemes. This is particularly the case under collaborative management arrangements in which, ideally, a participatory approach should be the main strategy used from the beginning, with regular assessments to review progress as a basis to improve the design and implementation. Under partnership schemes, it is important to consider factors affecting the community partners' commitment to sign a contractual agreement, principally: the company respecting the customary values of their land, transparent information in the process of determining the timber prices, and benefits that are competitive with other estate crops such as rubber and/or oil palm. From the company's perspective, it is important that the community partners adhere to all of the points included in the contractual agreement, one example of the most important ones being to ensure company access over the period of the contract.

Fifthly, the benefit-sharing mechanism needs to be clear. An unclear basis for defining shared benefits from harvested timber can be a source of potential conflicts among the stakeholders involved, particularly, in community tree-growing schemes often involving government investment, such as by state-owned company Perhutani, to develop the timber plantations as part of the forest rehabilitation programme. Further, a clear benefit-sharing mechanism should also include brokers/middle-men, because of their potential role in handling the direct and transaction costs during timber harvesting and transporting (see Section 6.2.3.4).

Sixthly, undervalued intangible costs and benefits should be taken into account in deciding the benefit-sharing agreement to ensure a fair and equitable benefit-sharing mechanism. All intangible benefits and costs should be taken into account in defining the actual benefit-sharing arrangements to reflect the community's contribution to forest maintenance, so that environmental services for the forest can be initiated, maintained and improved. Under the partnership schemes, parties other than the community partner and company also receive direct and indirect tangible benefits resulting from acacia plantation development if these plantations can be sustained in the long-term. Such benefits include the payment of *PSDH* to the central government (i.e. Ministry of Forestry), which will eventually be allocated to provincial and district governments. In addition, there are free riders, such as the *preman* (illegal money collector), who usually gets the money during harvesting or transporting the timber.

6.2.3.4. Towards independent community plantations: current challenges

The government has an overly high expectation of community capacity and interest in investing in and developing tree plantations inside state forests. As described in Chapter 1, this has been reflected in the MoF target set for schemes such as the *HKm* and *HTR* (Partnership for Governance Reform, 2011).

There are at least six challenges highlighted in moving towards community tree-growing plantations that are developed independently (Table 6-8). The six challenges can be compared between the two schemes, in terms of: (1) effectiveness of the existing regulatory framework, (2) community institutional capacity, (3) community financial and business management capacities, (4) high dependency on other parties to cover the costs, (5) competitiveness of other management scenarios, and (6) keeping community interest high.

The first comparison is the effectiveness of the existing regulatory framework in providing opportunities for local communities to develop small-scale plantations independently. As discussed in Chapter 4, in accordance with the current regulations, communities have been provided with the opportunity to develop their own planted timber trees for commercial purposes, including the rights to harvest. A community involved in partnership schemes has an independent model under the *HTR* scheme that provides community partners with the opportunity to form a cooperative, particularly for those who are interested in obtaining concession areas for developing timber plantations (see Section 5.2.3.1 of Chapter 5). There is also a loan scheme designed by the government that can be used to develop timber plantations. However, there are no clear guidelines on the practical implementation of these regulations.

Second, community institutional capacity at the current management level is quite limited. As discussed in Sections 4.2 and 4.3 of Chapter 4, under the community tree-growing scheme, training was provided by local government. However, the effectiveness in improving community institutional capacity was untested. Under community-company partnership schemes, limited training was provided for some tree-grower groups on the technical knowledge required for managing the trees. No further significant management decisions required the involvement of tree-grower groups, as discussed in Sections 5.3 and 5.4 of Chapter 5.

Third, the capacity of the community in financial and business management is low. Improving capacity in financial and business management was part of the NSFP design but was not included in other programmes under the community tree-growing schemes. As discussed in Chapter 4 (Section 4.2.2.1.2), the NSFP programme was only implemented for three years, with no clear plan for follow-up. The new MoF regulation was issued to replace the regulatory framework of the NSFP.

Under partnership schemes, there has been no transfer of knowledge and experience to community partners with regards to management costs and business decisions, since the company deals with most of these matters. With insufficient information to manage their plantations to receive optimal benefits from the company, community partners' commitment could be weakened. Low commitment could eventually lead to the contract being broken. Keeping community interests in tree-growing high is also important, for example by adjusting the royalty applied for the purchase of timber from the community to reflect the opportunity cost of using similar resources (see more discussion later in this section).

Table 6-8. The main challenges for communities trying to develop independent community plantations

Factors to challenges	Schemes	
	Community tree-growing	Community-company partnership
1. Effectiveness of the existing regulatory framework	Procedures to submit the application is too complicated with unclear practical guidelines [a]	Opportunities do exist, but there are unclear practical guidelines [b]
2. Community institutional capacity	Training was provided by local government; the effectiveness was untested	Limited training provided, but tree-grower groups' involvement in decision-making is limited
3. The capacity of community in financial and business management	Limited opportunities for improving financial and business management capacities [c]	Company deals with most of the cost management and business decisions
4. High dependency on other parties to cover the costs	Government-driven programme	High dependence on company
5. Competitiveness of other management scenarios	Competitiveness depends on cost management that is sensitive to productivity per ha and scale of management	Low productivity in the partnership areas due the different silviculture practices
6. Keeping community interests high	Formal rights endorsement should be less bureaucratic and community rights to timber should be clearly granted	Enhancing community partner roles by providing training to increase capacity in business and financial management

Notes:

a. Referring to MoF Decree No. P. 37/Menhut-II/2007, 35 year rights are granted following a successfully approved application
b. As part of the *HTR* Programme according to MoF regulation No. PP. 6/2007
c. NSFP (National Social Forestry Programme) (see Section 4.2.2.2 of Chapter 4).

Fourth, in addition to the high dependency on external facilitation in the initiation processes (as discussed in Section 6.2.3.3 in this chapter), there is a high level of dependency on third parties to cover the timber plantation development costs. This has mainly been because the analysis of cost per ha has shown how expensive developing timber plantations is under the two strategies. As a consequence, communities have to depend on third parties to develop timber plantations inside state forests to cover these costs, especially to cover overheads and transaction costs (Table 6-9).

The current management of the community tree-growing scheme is not feasible due to high cost per ha. This has been mainly due to low standing stock despite high initial costs invested by the state-owned company in large areas (see discussion in Section 4.4, Chapter 4). The average cost per ha for timber without inter-cropping (Rp 70 million or AUD 8,302) is seven times higher than the government standard cost per ha for developing the latest *HTR* Programme, which is Rp 10 million (AUD 1,288).[24] If timber standing stock can be restored to the initial density of the planted trees, the planting costs per ha can be reduced. However, since harvesting and transporting costs are a function of timber volume, it is estimated these may be more than ten times higher than the total standard costs for fully-stocked stands. This shows that harvesting and transport, which has always been the main challenge in small-scale timber plantation management, needs to be better managed (Godoy, 1992b; Nawir *et al.*, 2003b). For example, improving productivity significantly and consolidating areas under different ownership in scheduling for harvesting would improve financial feasibility.

As noted above, the average cost per ha under the partnership schemes is three times higher than the standard costs for the *HTR*. There are also slight differences between the costs per ha under current management and improved conditions. One challenge for the *HTR* government standard is that it is calculated only for one rotation (Nawir and ComForLink, 2007). Furthermore, the process of calculating the standard costs does not take into account the cost for pre-plantation development, such as applying for the rights under the *HTR* programme.

[24] Based on MoF Decree No P. 64/Menhut-II/2009 on the costing standard for Industrial Timber Plantation (*HTI-Hutan Tanaman Industri)* and Community-based timber plantation (*HTR-Hutan Tanaman Rakyat).*

Table 6-9. **Cost per ha for the current management and improved conditions for the two schemes**

Management	Unit	Tree-growing schemes	
		Community tree-growing	Partnership
1. Current condition [a]	Rp (million)/ha	70	31
	AUD/ha	8,302	3,692
2. Improved condition [b]	Rp (million)/ha	124	30
	AUD/ha	14,690	3,559

File: Compilation of economic analysis 2 schemes - Cost per ha

Notes:
a. Current condition based on current productivity per ha and standing stock
b. Improved condition based on standing stock following the appropriate silviculture practices.
Sources: Analysed from: data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005); data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); BPS (1994-2009); BPS Sumbawa (2008); BPS Bima (2010); BPS Jambi (2010) and BPS Kalimantan Barat (2010).

The roles of third parties are important in ensuring that commercially feasible management can be achieved. Based on the two community tree-growing case studies, the government's contributions to total costs ranged from 36 to 68% (Box 6-4). Wood buyers at the farm gate, as third parties, account for from 25 to 51% of total costs, mainly to cover the harvesting and transporting costs, as well as paying associated timber levies. Usually, these wood buyers are brokers/middle-men who resell the wood to the local sawmills or furniture-making industries in Java. The significant proportion of costs met by government and wood buyers makes it difficult for community tree growers to be self-funding, due to their limited financial capacity. One response to this challenge could be to develop a reinvestment strategy using revenues generated in the design of community tree-growing schemes (Nawir *et al.*, 2007e).

In line with the low community capacity to bear the costs in developing timber plantations, the annual net returns received by households involved are also small compared to the revenue received by the government, the company and other parties, such as middle-men and contractors (Box 6-4). For example, under community tree-growing schemes, annual household income from timber is only about 4% of the value received by the government and about one-fifth of the value gained by middle-men.

Under partnership schemes, community partners only receive an annual income from timber that is about 6% of the total company benefits, and about one-tenth of the benefits received by contractors. Empowering communities' financial capacity through mechanisms such as micro-financing is very important to foster communities' capacity to more fully participate in and benefit from commercially oriented small-scale commercial tree-growing (e.g. also highlighted by: Pokorny *et al.*, 2010; Nawir, 2013; Macqueen, 2013). Other mechanisms include providing training to improve tree-grower business and enterprise development skills (e.g. also highlighted by: Pokorny *et al.*, 2010; Nawir, 2013; Macqueen, 2013).

Under partnership schemes, there are clearly strong dependencies on the companies' assistance to cover the full cost of initiating the schemes, as well as costs for timber plantation development of up to 98% of the total. Tree-grower cooperatives' contributions range from as insignificant an amount as 2% to a maximum of 27%, which are mainly for covering their labour costs for supervision, fire prevention, group meetings and negotiation. In the scheme developed by FI, this contribution was allocated for managing rubber plantations (see Section 5.5.2 in Chapter 5 for detailed discussions). It is important to mention the roles of contractors, for example, because companies prefer to outsource different plantation development activities to contractors for efficiency reasons (see Section 5.5.1 for more discussion). However, the share of costs attributable to contractors is yet to be determined. This requires further detailed data collection, which is often difficult from contractors and companies. Unfortunately, due to limited time and budget, the important roles of these contractors could not be covered in this thesis.

Box 6-4. Distribution of cost bearing and sharing between different stakeholders under the two schemes (under current standing stocks)

Stakeholders	Tree-growing schemes	
	Community tree-growing	Partnership
Government	36% - 68%	-
Tree grower cooperatives	8% - 14%	2% - 27%
Wood buyers at farm gate	25% - 51%	-
Company	-	73% - 98%

File: Compilation of economic analysis 2 schemes - Cost borne

Description	Unit	Tree growing schemes	
		Community tree-growing	Partnership
1. Tree grower households			
a. Total net income	Rp million/household	1.2	12.2
	AUD/household	139	1,467
b. Income from timber	Rp million/household	0.9	4.6
	AUD/household	105	556
c. Other incomes [a]	Rp million/household	0.3	7.6
	AUD/household	35	911
2. Company	Rp million	-	25.8
	AUD	-	3,090
3. Government [b]	Rp million	21.0	62.2
	AUD	2,486	7,378
4. Others [c]	Rp million	6.9	70.2
	AUD	817	8,324

File: Compilation of economic analysis 2 schemes - Annual benefits

Notes:

a. Other incomes for community tree-growing schemes are from inter-cropping and for partnership are from rubber and incentive packages

b. Government revenue from community tree-growing schemes comes from potential shared benefits from harvested timber, government-based land rent and tax; and for partnership revenues come from *Provisi Sumber Daya Hutan-PSDH* (Forest resources provision), fees paid to state for *HTI* permits, and *Pajak Pertambahan Nilai-PPN* (Value Added Tax)

c. Other stakeholders under community tree-growing schemes are wood buyers at the farm gate, such as middle-men/brokers; and under partnership schemes are contractors, in which their benefits are estimated from labour costs paid by the company (see Box 5-2 in Chapter 5 for more explanations).

Sources: Analysed from: data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005); data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); BPS (1994-2009); BPS Sumbawa (2008); BPS Bima (2010); BPS Jambi (2010) and BPS Kalimantan Barat (2010).

Independently developed community plantations could potentially reduce or avoid some of the costs that have to be covered under community tree-growing and partnership schemes. This is the case for the partnership scheme (Box 6-5). However, it is not the case for the community tree-growing scheme, since the dominant costs are mainly the government budget allocation that cannot be avoided. For small-scale operations, costs that could potentially be eliminated include the overheads and transaction costs and the harvesting and transportation costs under the assumption that the company or the buyers will take care of these costs, albeit at reduced returns to the growers.

All of the acacia plantation costs for the management scenarios analysed over the total period of the partnership contract are higher than for the government standard cost per ha for *HTR* development. However, the cost per ha for a single rotation, both with and without harvesting and transportation costs, is lower than this government standard cost. This is because the government set the standard costs for only one rotation under the *HTR*, which then was used as the basis for providing the community with credit and would not lead to the long-term management (Nawir and ComForLink, 2007).

Fifth, the competitiveness of other management scenarios is another important aspect of understanding the extent to which tree-growing can be developed independently by a community. In both schemes, productivity per ha is one of the most important factors affecting the feasibility, as mentioned in Section 6.2.3.2. Under partnership schemes, different levels of productivity are a result of the differences in silvicultural practices applied. Smallholder rubber and oil palm plantations are the principal competitors and comparators. As discussed in Box 6-5[25], if the company standard productivity can be achieved, the household benefits from acacia plantations may be comparable with returns from these competing activities. Alternatively, households have to allocate more land for developing acacia plantations.

---

[25]Analysis per ha (as presented in this box) provides the basis for a straightforward comparison on different investment alternatives without have to be constrained by the scale of management (Predo and Francisco, 2008).

Analysis of the returns from community tree-growing schemes and alternative investments developed in the local areas indicate that, at the current standing stock, timber management provides lower annual benefits per ha (at Rp 1 million or AUD 139) than the alternatives, despite there being no significant difference in cost per ha (Box 6-6). However, taking into account the sizes of areas managed by individual households, the household-level analysis has shown that there is no significant difference between timber and alternative crops in the level of the annual net benefits received. Therefore, there are no opportunity costs of timber management at the household level. However, as discussed in Section 6.2.3.2, if the timber standing stock could be restored to its original condition when the plantation was first developed, generating greater annual benefits per ha, returns from tree growing to households could be improved. Therefore, to strengthen and promote small-scale commercial tree-growing inside state forests, it is important to involve the community from the beginning, so that stocking levels remain high.

At the current standing stock, the smaller-scale management is better; while at the full standing stock level, the cost per ha becomes more expensive, with lower annual net benefits per ha. If the full standing stock conditions can be maintained, large-scale management is more economically attractive. However, for larger-scale management to succeed, communities should be involved from the beginning, since 30 years of experience suggests that maintaining the state forest plantations without a significant local community involvement is quite challenging (Nawir *et al.*, 2007d). Involving the local community, so that they share the costs, risks and benefits of larger scale management is central to any successful tree growing strategy inside state forests.

Box 6-5. Comparison of different management scenarios for partnership schemes: cost per hectare, annual net benefits per hectare and per household [a]

The average highest costs per ha for developing acacia plantations is comparable to the development costs for smallholder rubber plantation management, using both local and high-yield species. The highest costs per ha for acacia are much lower than for oil palm plantations, under both schemes. The annual benefits per ha for rubber plantations using local species are almost double those of the highest benefits from acacia plantations. Due to the low current productivity of oil palm, the benefits from company-standard acacia plantations are comparable to the benefits received from an independently-developed smallholder oil palm estate. Taking into account the average total land area allocated by households for different plantations, the highest benefits received per household are from rubber plantations using high-yield species. Acacia plantations provided comparable annual benefits per household, compared to rubber and independent oil palm plantations, at typically-stocked stands.

Management scenarios	Cost per ha		Annual net benefits per ha		Annual net benefits per household	
	Rp million	AUD	Rp million	AUD	Rp million	AUD
1. Independent scenario with timber harvesting and transportation costs						
A. Total period of partnership contract analysis [b]						
a. Using company standard acacia productivity [c]	28	3,379	1.5	177	13	1,483
b. Using current acacia productivity [c]	19	2,300	0.7	83	6	699
B. One rotation analysis [b]						
a. Using company standard acacia productivity [c]	11	1,306	0.9	106	7	867
b. Using current acacia productivity [c]	7	793	0.5	59	4	470
2. Independent scenario with no timber harvesting and transportation costs						
A. Total period of partnership contract analysis [b]						
a. Using company standard acacia productivity [c]	24	2,831	1.7	196	14	1,681
b. Using current acacia productivity [c]	17	2,056	0.8	97	7	841
B. One rotation analysis [b]						
a. Using company standard acacia productivity [c]	9	1,067	1.0	116	8	970
b. Using current acacia productivity [c]	6	693	0.6	67	5	545
3. Land use alternatives						
A. Smallholder rubber plantations						
a1. Using local species (junggle rubber)	26	3,030	2.7	316	14	1,662
a2. Using high yield species	27	3,220	7.9	938	42	4,939
B. Oil palm plantations						
b1. Under partnership schemes	46	5,398	0.9	110	11	1,316
b2. Smallholders (independent)	36	4,284	2.2	258	26	3,101

File: Compilation Jambi & Sanggau 220611.xls - Comp if independent scenario

Notes:

( ): Negative value

a. For the partnership scheme, focussing on timber management

b. Based on the average of total areas individual households for partnership scheme

c. Independent scenarios: no overhead and transaction

d. Total period: 39 years for FI and 30 years for WKS; one rotation is 7 years for FI and 5 years for WKS

e. Company productivity is 150 m^3/ha; current acacia productivity is 106 m^3/ha for FI, and 107 m^3/ha for WKS.

Sources: Analysed from: data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005); data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); BPS (1994-2009); Wulan *et. al.* (2006); Adiwinata (1999); BPS Sumbawa (2008); BPS Bima (2010); BPS Jambi (2010) and BPS Kalimantan Barat (2010).

Box 6-6. Comparison of different management scenarios for community tree-growing schemes: cost per ha, annual net benefits per ha and per household

At the current management level, alternative investments provide higher annual net benefits per ha, mainly from a combination of cashew and candle nuts at Rp 1.15 million (AUD 136), and turmeric and ginger at Rp 5 million (AUD 563) compared to negative benefits for the national tree-growing programmes at Rp 1 million (AUD 139). These benefit levels are despite there being no significant differences in cost per ha, ranging from Rp 31 million (AUD 3,712) to Rp 42 million (AUD 5,003) for tree-growing, and Rp 34 million (AUD 4,014) for turmeric and ginger to Rp 49 million (AUD 5,761) for cashew and candle nuts. Costs per ha at full standing stock are higher for both types of management with higher harvesting and transportation costs due to significant increase in timber volumes.

At the household level, significant benefits could be gained by restoring tree-growing to full standing stock for both types of management at an average of Rp 10 million (AUD 1,132-1,236). These benefits are higher than household benefits from the alternative investments, cashew and candle nuts and turmeric and ginger, at Rp 7 million (AUD 852) and Rp 9 million (AUD 1,045), respectively.

Management scenarios	Cost per ha		Annual net benefits per ha		Annual net benefits per household	
	Rp million	AUD	Rp million	AUD	Rp million	AUD
1. Timber management						
A. National tree-growing progammes [a]						
a. At current standing stocks [b]	42	5,003	(0.25)	(29)	-	-
b. At full standing stocks	108	12,750	15	1,838	10	1,132
B. Local tree-growing initiatives [c]						
a. At current standing stocks	31	3,712	1	139	2	230
b. At full standing stocks	140	16,630	10	1,176	10	1,236
2. Alternative investments [d]						
A. Cashew and candle nuts						
a. Current productivty	49	5,761	1.15	136	1.42	168
b. Higher productivty	55	6,517	6	689	7	852
B. Turmeric and ginger						
a. Current productivty	34	4,014	5	563	6	696
b. Higher productivty	23	2,708	7	844	9	1,045

File: Compilation Sumbawa & Bima.xls - Other investment combine (4)

Notes:
( ): Negative value
a. Typical government tree-growing programmes as implemented in Sumbawa on a large scale
b. No financially feasible scenarios, even for the base case (see Section 4.4 of Chapter 4)
c. Initiated by local government (i.e. FDA) on smaller-scale areas due to limited budget (e.g. in Bima)
d. Focussing on feasible combinations of cashew and candle nuts, and turmeric and ginger; the other combinations are not feasible (see Section 4.4.4 of Chapter 4).

Sources: Analysed from: data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005); data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); BPS (1994-2009); BPS Sumbawa (2008); BPS Bima (2010); BPS Jambi (2010) and BPS Kalimantan Barat (2010).

6.3. Improved frameworks for feasible and commercially competitive small-scale tree-growing management

Taking into account the aspects identified previously for enhancing feasible and commercially competitive tree-growing (Section 6.2), frameworks for improving current management practices are proposed here. Section 6.3.1 focuses on proposed policy and direct and indirect economic incentives to improve the competitiveness of community tree-growing schemes, while Section 6.3.2 discusses similar incentives for partnership schemes.

6.3.1. Community tree-growing schemes: proposed policy and economic incentives to improve the competitiveness of small-scale tree-growing strategies inside state forests

As discussed in Chapter 3 (Section 3.3.4), the scope of the analysis is based on alternative visions of the future to enhance and stimulate commercial tree-growing in Indonesia that will be beneficial not only for the smallholders involved, but also for national timber production. Further, the scope of the analysis is centred on required and possible improvements to the current systems, particularly by ensuring direct and indirect (enabling) incentives are in place. Improved conditions are developed to overcome challenges drawn from the discussion in Sections 6.2.2 and 6.2.3, as well as in response to the results of the analysis as discussed in Chapters 4 and 5. Therefore, three important future criteria for the framework development are: first, finding the right strategy for producing timber to meet the national demand; second, as community-based forest management is still an important strategy in state forest management, the government is interested to enhance the strategy for commercial timber production by developing improved policies and legislation; and third, the policies and legislation can improve smallholder access to the market and deliver more equitable benefits.

The first step in the framework development process is to identify relevant key stakeholders who play an important role in applying the necessary improvements. Under the community tree-growing scheme, key stakeholders are mainly community members as a cooperative or tree-growers association, government at the central (i.e. MoF) and district (i.e. FDA) levels, and direct wood buyers who are mostly wood brokers/middle-men (Table 6-10). These stakeholders have different interests, roles and positions of power. Due to the state property status of the forest managed by a community, the most powerful is the MoF at the national level, while the tree growers are less powerful.

Improved direct and indirect (enabling) incentives are organised under three main categories (Figure 6-3). The first is the required improvement of the overarching institutional and policy framework which aims for feasible and competitive tree-growing. In the second category are the essential aspects for supporting robust and competitive enterprises at the management level. The third category is the improvement of incentives necessary to ensure the development of a secure and fair timber market, as well as secure and fair access to the market for tree growers.

Under the first category, two sets of policy framework are required: (1) supporting robust and competitive management arrangements as included in Box 1, and (2) supporting secure and fair market development and access as described in Box 2. In supporting robust and competitive management (Box 1), the policy framework should comprise: (1) simplified procedures imposed by the MoF for the submission of applications for *HKm*, particularly for tree-growing; (2) a strong commitment on the part of the MoF to granting formal endorsement when a tree-grower group has proved it is capable and committed to managing state forests sustainably, to simplifying the procedures and to minimising inconsistencies and conflicting policies and legislation, and (3) well-designed capacity-building programmes on management and finance, supported by extension services at the community level. Overall, points (1) to (3) require pro-active district government (i.e. the FDA) action in developing matching policy and legislation frameworks at the district level, based on participatory processes (e.g. the case of Sumbawa District Government initiative discussed in Chapter 4). Further, the central government (i.e. the MoF) should give the FDA more opportunity to be involved in the planning process at the national level.

Table 6-10. Key stakeholders' interests, positions and roles in community tree-growing schemes

Key stakeholders	Interests	Power position	Roles for community tree-growing scheme
Ministry of Forestry (MoF)	Managing and enforcing laws pertaining to state forest property Developing forest rehabilitation programmes in degraded forest areas to meet the wood demand and to facilitate community's participation	Legally at the national level, very powerful and has prominent roles in defining policy framework and regulations, which are not necessarily implemented on the ground	Responsible mainly for processing and reviewing the applications in granting the formal rights in state forests management
Forestry District Agency (FDA)	Enforcing laws pertaining to state forest property on the ground by implementing the national legislation and dealing with conflicts over forest area boundaries	Since regional autonomy in 1998, FDA has more prominent roles in state forest management on the ground	Producing policy framework and regulations at the district level by referring to the national level policies and regulations
Tree growers (cooperative members)	Having access to state forest areas for inter-cropping or collecting timber and non-timber products to generate household income	In most cases very weak along the supply chain, unless they become a member of tree growers association/cooperative which may increase their bargaining power	Their roles have been undermined. Potentially, they have important roles in enforcing the laws on state forest property as well as in defining the quantity and quality of timber that can be harvested, which is quite important to the wood industry
Middle-men/wood buyers	Maximum profits taken along the supply chain	Economically very powerful in the timber supply chain compared to most tree growers, particularly those who do not organise themselves into cooperatives/tree grower associations	Working between tree growers and wood industries. Covering the transaction costs of obtaining permits for harvesting and transporting that could not be covered by tree growers, which is the main reason most tree growers sell the timber at the standing value

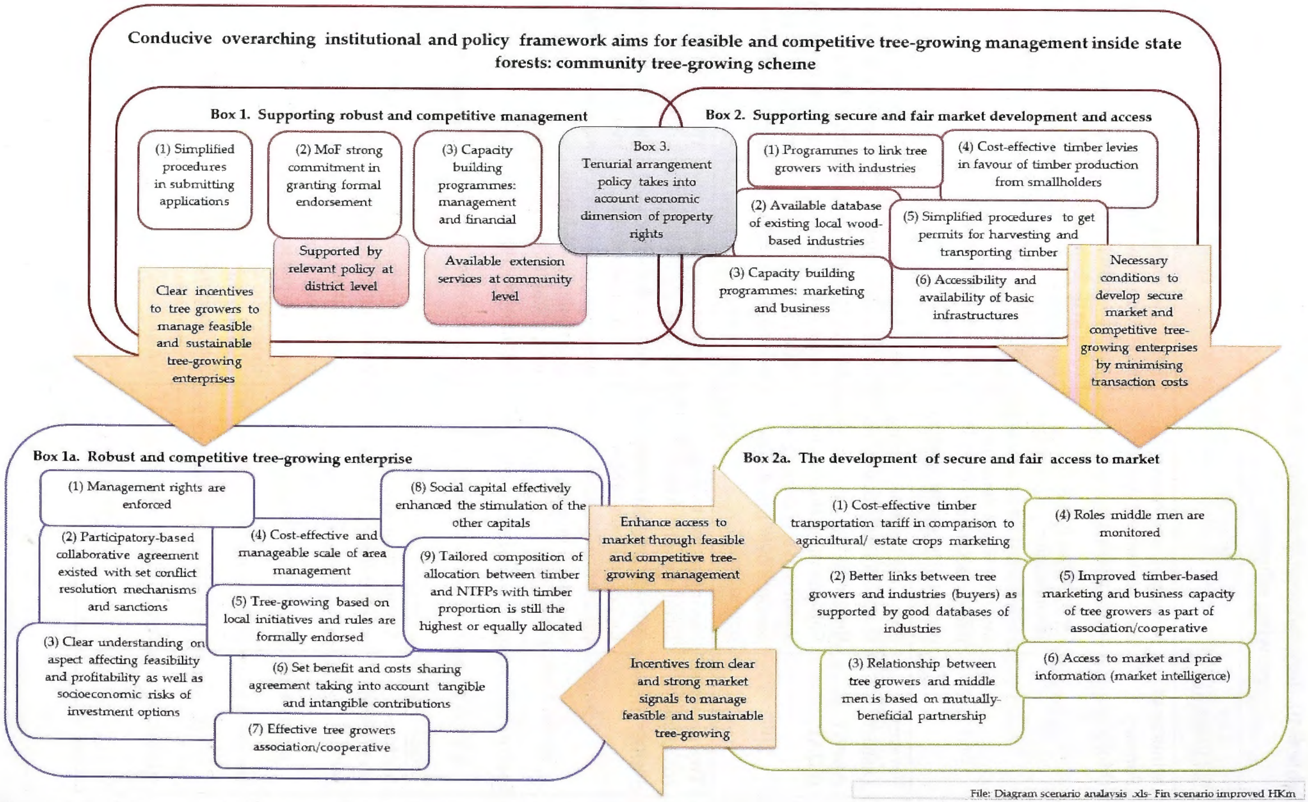


Figure 6-3. A framework for strengthening policy and economic incentives for community tree-growing schemes

At the management unit level (Box 1a), the overarching institutional and policy framework at the national (ministerial) level is a useful base on which to define the necessary conditions to ensure tree-growing enterprise management that is robust and competitive in comparison to other economic land use alternatives. The necessary conditions are: (1) the enforcement of management rights, including inter-cropping and timber management (even for timber produced from the government rehabilitation programme), the formal government system has to secure rights developed according to local initiatives and rules; (2) participatory-based collaborative agreements with established conflict resolution mechanisms and sanctions; (3) a clear understanding of the aspects affecting feasibility and profitability as well as the socioeconomic risks of investment options; (4) cost-effective and manageable areas for communities to manage; (5) tree-growing based on local initiatives and rules that are formally endorsed; (6) established benefit and cost-sharing agreements, taking into account tangible and intangible contributions; (7) effective tree-growers associations/cooperatives; (8) the social capital to effectively enhance and stimulate other capital; and (9) the tailored composition of allocated timber and NTFPs, the timber proportion being the highest or equally allocated.

Nevertheless, it is important that in improving the management, the aforementioned principles should be based on a feasibility analysis and cost-effective considerations, taking into account the labour and financial capacity as well as the priorities of the local livelihood strategies of the tree growers. It is also crucial for robust and competitive tree-growing enterprises to include a conflict resolution mechanism, together with mutually agreed sanctions by all stakeholders against those violating the rights (from internal tree-grower members), as well as against forest encroachers and illegal loggers (outsiders).

The second component required for the overarching institutional and policy framework is support for secure and fair market development and access, which can be an effective incentive to stimulate robust and competitive enterprises at the management level, mainly by minimising transaction costs (Box 2). As discussed in Chapter 4 (Section 4.4) and this chapter (Section 6.2.3.2), one of the biggest challenges in sustaining the community tree-growing initiatives is access to the market; however, if robust and competitive enterprises can be ensured at the management level, it is much easier for timber production from community tree-growing to be marketed and to attract buyers. Also it would lead small-scale tree-growing management to become more feasible, and in doing so facilitate certification and international market access (Alemagi *et al.*, 2012; Auer, 2012; Wiersum *et al.*, 2013; Harada and Wiyono, 2014).

At the national level, as a priority of the MoF, there should be a systematic programme to link tree growers with the wood-based industries, and this should be supported by good databases of industries at the national and district levels (Box 2a). This is the initial stage as part of the efforts to secure the market and the wood-based processing industries located locally within the district and/or in other districts/provinces. Industry databases should cover wood-based processing not only on the large and medium scale, but also on the small scale. The current database focuses only on large and medium-scale wood-based industries more than 6,000 m^3 (MoF, 2010c).

A systematic programme to link tree-grower associations and wood processing based on good databases should be supported by cost-effective timber levies in favour of timber production from smallholders. Harvesting and timber transport permit procedures need to be simplified as do permits for agricultural and estate crops, such as those for oil palm plantations (Nawir and ComForLink, 2007). This should be consistent with the improved accessibility and availability of the basic infrastructure.

At the management level there should be capacity-building programmes to empower tree growers and their associations, increasing their bargaining power and managing their tree plantations (Box 2a). The capacity-building programmes should focus mainly on improving tree growers' marketing and business skills. This programme needs to be embedded in the national government overarching policy framework and legislation, supported by the local district government for its implementation on the ground. Having collaboration with local and national wood buyers in understanding their expectations, from both the demand and market sides, would be beneficial.

Further, at the management level, incentives for ensuring secure and fair access to timber market development should focus on making access to market and price information available to tree growers. In line with a transparent market and price information, the roles of middle-men/brokers in the timber supply chains need to be monitored by the FDA to ensure the relationship between tree growers and middle-men is based on mutually beneficial principles (see Nawir *et al.*, 2003 for further discussion on important mutually beneficial principles under partnership arrangements).

There are five points of uncertainty to be taken into account that affect the outcomes, for both community tree-growing and partnership schemes (as discussed further in Section 6.3.2): (i) nationally, the MoF has different priorities and often has to deal with conflicting polices and legislation produced by other ministries, such as the Ministry of Agriculture (MoA); (ii) different development and economic priorities of district governments that affect the setting of priorities and programmes by the FDA; (iii) changing priorities of tree growers on allocated land, driven by household needs and market signals, such as for food crops and/or options with higher benefits; (iv) shifting priorities among the wood processing industries, for example due to cheaper imported materials. As discussed further in Chapter 7, government intervention is required to link the industry and the markets strategically to timber produced by the tree growers, based on industry characteristics and processing capacities, and; (v) uncertainties caused by external factors, such as timber prices, economic crises and cycles, and the national political conditions.

6.3.2. Community-company partnership schemes: proposed policy and economic incentives to improve the competitiveness of small-scale tree-growing strategies inside state forests

Similar justifications to those used in Section 6.3.1 to justify the proposed policy and economic incentives for community tree-growing schemes are used to develop a similar framework for community-company partnership schemes. The stakeholders involved are: community members as a cooperative or tree-growers association; the company that initiated the partnership with the community to establish timber plantations and guarantee the market; contractors (outsourcing workers); and the government at the central (i.e. MoF) and district (i.e. FDA) levels. These stakeholders have different interests, roles and power positions (Table 6-11). The company and its community partners play important roles in developing tree-growing under partnership schemes to become more commercially competitive. The MoF at the national level is not involved directly in implementing the partnership scheme. However, it does have the very important role of providing the enabling overarching policy framework required for plantation development under the partnership scheme, which is more commercially competitive than are alternative land uses. On the other hand, the FDA at the district level has an important role as facilitator to companies following the procedures for developing timber plantations. The roles of contractors in the smooth implementation of the partnership schemes have often been underestimated; for example, they have an important role in managing the plantations on the ground, such as in planting and other silvicultural practices as well as harvesting the timber (see Section 5.5.1 for more discussion).

Table 6-11. Key stakeholder interests, positions and roles in community-company partnership tree-growing schemes

Key stakeholders	Interests	Power position	Roles for community-company partnership schemes
Tree growers (cooperative members or individual households)	Utilising their lands managed/claimed to be more productive, otherwise are idle/unproductive	Guarantee company has full access to the land claimed by community members, so timber plantations can be developed	Compared to the company, their power is quite weak, particularly in defining the conditions of the partnership agreement, unless tree growers are organised as a group, or start a riot during conflicts
Company	Interested in securing its operations for producing timber and wood products, particularly by minimising conflicts with surrounding villagers over concession areas	Providing all of the production inputs as required for tree-growing under partnership schemes and securing a market for the timber produced	Compared to its community partner, the company has more power in defining the nature and direction of the partnership arrangement, and how the arrangement can be beneficial to the tree growers
Contractors (outsourcing workers)	Generating income by taking advantage of working opportunities offered by the company and some work not taken by tree grower partners due to limited family labour	Important in filling the gaps where labourers are required as part of timber plantation development at all stages: land clearing, preparation, planting, maintenance, harvesting, and transporting	Compared to the company, their power is quite weak, particularly in defining the conditions of the working contract. Compared to tree growers, some contractors have more power in negotiating the conditions, although the company makes the final decision
Ministry of Forestry (MoF)	Developing industrial timber plantations and developing the forest rehabilitation programme in degraded forest areas within the framework of timber production to meet the wood demand	Legally at the national level, very powerful and has prominent roles in defining policy framework and regulations for industrial timber plantations.	No direct role since the company can initiate and develop the partnership scheme independently
Forestry District Agency (FDA)	Enforcing laws pertaining to state forest property by implementing national legislation and dealing with problems associated with industrial timber plantation development	Since regional autonomy was introduced in 1998, FDA (and local district government) has more prominent roles in state forest management on the ground	Impose and supervise the implementation of policies and regulations

The improved framework for the community-company partnership scheme is organised under two main categories: first, conducive overarching institutional and policy framework (Box A), and second, robust and competitive tree-growing management under partnership arrangements (Box B) (Figure 6-4). Enabling overarching policy frameworks are required for all of the processes as part of timber plantation development under partnership schemes. Under the first category, the underlying component is the overarching policy framework on tenurial arrangements (Box a1) that is framed by the principles of the economic importance of property rights: comprehensiveness, duration, adequate withdrawal rights, transferability and exclusiveness (as discussed in Section 6.2.3.1). A clear tenurial arrangement policy is the most important principle during the land acquisition processes that facilitate a smooth implementation from land preparation and clearing stages (Box a3) to harvesting and transporting processes (Box a4). In each of this stages, there are components reflecting the necessary practical conditions, which are put together based on the analysis on case studies discussed in this thesis (see Chapter 5).

As included in Box a5, for all these components it is also important and necessary to have a clear set of roles for the FDA and other independent parties, such as NGOs, in monitoring, supervising, and mediating conflicts. Overall, across the three processes of land acquisition, land preparation and clearing, as well as harvesting and transporting, these processes require simplified legislation and regulatory frameworks with manageable transaction costs for ensurimg competitive management of partnership schemes. For example, applying a lower tariff for transporting timber consistent with agricultural and estate crops is required.

At the national level, the main overarching policy framework should be based on well-integrated planning of land allocation policy for the development of the different sectors, mainly in forestry, agricultural and estate crop investments. This is particularly important to prevent forest areas from being converted illegally to agricultural and estate crops, such as oil palm plantations. However, this integrated planning requires reliable and systematic databases. Specifically, databases are also required to identify degraded areas and *APL*.[26] Conflicting interpretation of such areas between the national and district level databases is one of the most important problems that urgently need to be resolved (Nawir *et al*., 2007e).

Despite companies' willingness to accept different types of land papers provided by prospective community partners, it is important to have simplified and cheap procedures imposed by government for community members to obtain land certificates, particularly for those who have privately owned land (see inside Box a3). For those who claim land inside state forests, it is important to have the land papers confirming ownership status sufficient to meet the legal requirements. Having secure land papers that are consistent with government regulations (legal tenure) is important to both parties. For community partners, legal tenure provides security when claiming benefits from planted timber. For the company, there is less risk to their investment with less possibility of the land being claimed by other investors. To encourage more communities to develop timber plantations, there should be policies allowing community partners with experience in the partnership scheme to apply for concession rights under the *HTR* Programme. They might also be permitted to sell their timber to a company operating in the area to secure the market for the timber produced.

[26] *APL-Areal Penggunaan Lain*, which are forested/non-forested areas that are allowed under MoF policy to be converted to other purposes, including to timber plantation (MoF, 2009c; 2010b) (see Section 5.2 in Chapter 5).

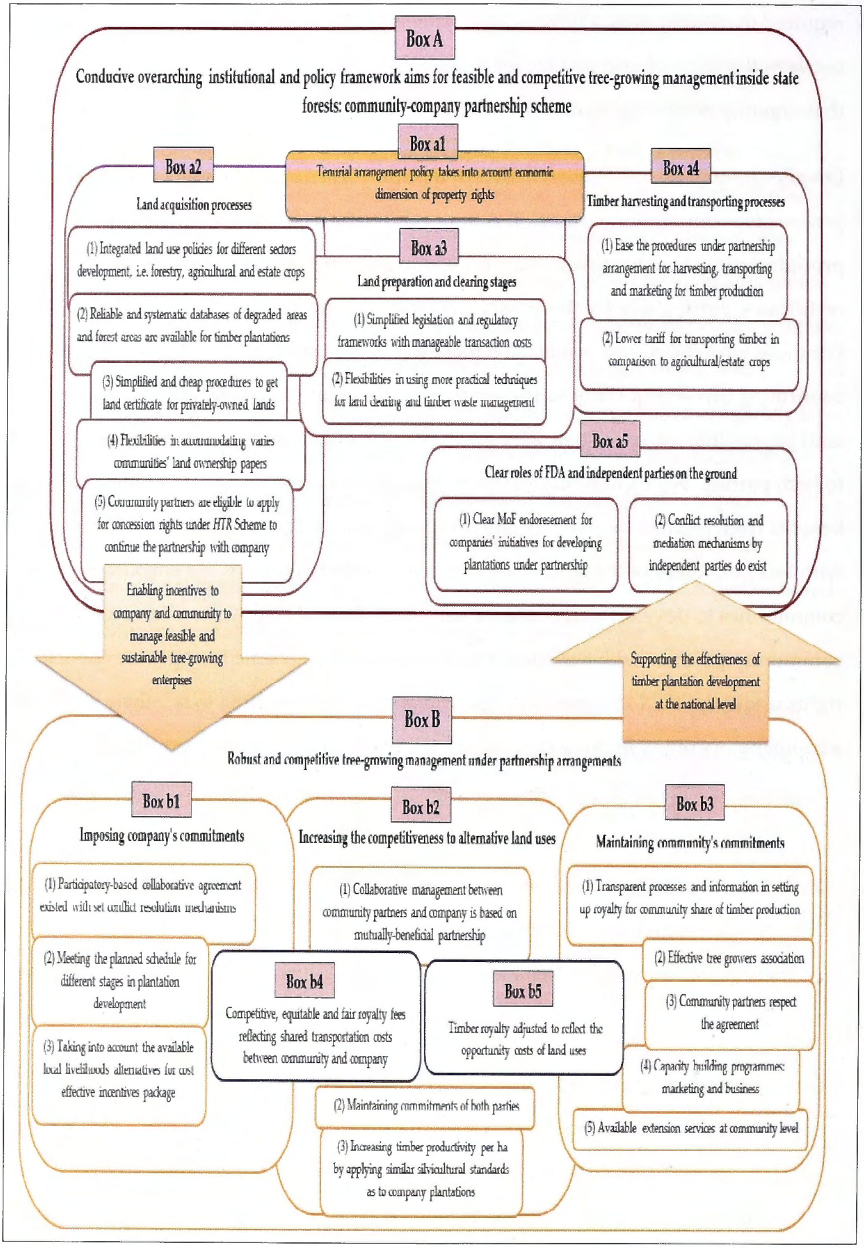


Figure 6-4. A framework for strengthening policy and economic incentives for community-company partnership schemes

At the management level (Box B), there are three important components that ensure robust and competitive tree-growing management under partnership arrangements. These are: first, enforcing companies' commitments (Box b1); second, increasing the competitiveness of tree-growing in comparison to alternative land uses (Box b2), and; third, aspects that have to be taken into account in maintaining a community's commitments (Box b3).

First, as presented in Box b1, a company should honour its commitments, so that community partners can see that the company is very serious about developing plantations under partnership arrangements. This is an important part of the principles ensuring mutually beneficial partnership schemes that have to meet the main three criteria: management, economic and socio-cultural aspects (described in Table 6-12). The two most important aspects are: (1) having developed a participatory-based collaborative agreement with set conflict resolution mechanisms, and (2) meeting the planned schedule of the different stages in plantation development, such as the harvesting schedule. As described in point (3), it would be easier for a company to meet its commitments by developing more realistic and cost-effective incentive packages by taking into account the local livelihood alternatives as part of the community partners' household income portfolio. As discussed in Section 5.5 (Chapter 5), households that have other livelihood options with significant income-generating potential may not be interested in using the company's incentive package for the purposes intended. Therefore, the second component focuses on increasing the competitiveness of tree-growing in comparison to alternative land uses (Box b2). In line with this component, maintaining the commitment of both parties and increasing timber productivity per ha should be mutually emphasised.

Table 6-12. Principles of a mutually beneficial partnership: management, economic and socio-cultural aspects

1. Management principles
Principle 1: Fair cooperation is the approach used in the management of the partnership
Criterion 1: A clear agreement among key stakeholders is developed through a participatory process Indicator a: Participatory process in place since the initiation Indicator b: Clearly understanding and implementing the rights and duties in the agreement document
Criterion 2: A clear management plan is designed through a participatory process among key stakeholders Indicator a: Management plan is well understood by key stakeholders Indicator b: Management plan is effectively implemented by ensuring the dissemination of information on technical and financial aspects
Principle 2: The implementation of partnership schemes encourages responsible practices of sustainable plantation forestry management
Criterion 1: Rules and guidelines of good practice in establishing plantation forestry are being adhered to in the partnership Indicator a: The relevant rules and guidelines are taken into account within the management plan Indicator b: The management plan is implemented following agreed codes of practice
2. Economic principles
Principle 1: The partnership schemes take into account the economic objectives of key stakeholders
Criterion 1: The scheme maintains a focus on the commercial interests of key stakeholders Indicator a: Comparative advantages increase Indicator b: Available markets for the planted timber of tree-growing partners Indicator c: Income options available to bridge the gap between planting and timber harvesting Indicator d: The scheme facilitates tree growers in becoming independent technically and financially
Criterion 2: Economic risks are anticipated Indicator a: Adequate proportion of the revenues from the main timber crops is reinvested to sustain the plantation and partnership scheme Indicator b: Diversification of products Indicator c: Alternative market exits if company fails to buy timber from growers
Principle 2: The benefits are shared based on the proportional inputs of each stakeholder
Criterion 1: Mechanisms for fair economic relationships and economic power sharing exist Indicator a: A fair benefit-sharing agreement exists
Criterion 2: A fair valuation of stakeholders' inputs Indicator a: All economic inputs are well-recorded Indicator b: Information is circulated transparently to all stakeholders
3. Socio-cultural principles
Principle 1: The implementation of partnership schemes satisfies the social objectives of various key stakeholders
Criterion 1: Various social objectives of key stakeholders must be recognised in the agreement and met in the agreement and met in order to optimize the adoption of partnership schemes Indicator a: Long-term land status/rights have been transparently settled prior to the establishment of forest plantation, and are respected by key stakeholders Indicator b: Local socio-cultural needs of key stakeholders are being considered and met whenever appropriate
Principle 2: The partnership schemes balance the differences among key stakeholders
Criterion 1: There is a mechanism to balance the different powers of stakeholders Indicator a: Conflict resolution mechanisms exist Indicator b: Possibilities to renegotiate the agreement exist

Sources: Nawir and Santoso (2005); and Nawir *et. al.* (2003b).

As described in Box b3, since the partnership arrangement is between company and community partners, the arrangement depends on community partners respecting the agreement. The company will benefit from having a workable long-term partnership arrangement by facilitating the conditions enabling community partners to maintain their commitments. For example, the company can assist in the formation of an effective tree-growers' association as a means for community partners to negotiate the points included in the agreement. For an effective tree-growers' association to function optimally, either the company and/or the FDA may organise a series of capacity-building programmes, such as on improving marketing and business skills and providing regular extension services at the community partner level.

If the company and community commitments are enforced, this will contribute to the increase in the competitiveness of timber plantations under partnership schemes with alternative land uses. Across the three components, it is important to have competitive, equitable and fair royalty fees reflecting shared transportation costs between community and company. As further explained in Box b4, one of the approaches is by adjusting the royalty for the price of timber bought from community lands under the partnership scheme, as estimated in Box 6-7. The timber royalty offered should reflect more the opportunity costs of tree-growing under partnership (Box b5), which are benefits from rubber and oil palm plantations in the case study analysis in this thesis. Adjusting the royalty would be possible from companies' side, since these companies have been enjoying a transfer payment by having an integrated plantation and processing management under one company group (Barr, 2001). Adjusting the royalty is particularly important if timber plantations under a partnership scheme are to be commercially competitive. In relation to these two components, one of the most important points for community partners in the agreement is to have transparent processes and information in establishing royalties for the community's share of timber production income.

Box 6-7. Royalty adjustment required for the price of timber bought from community lands under the partnership scheme

The most important alternative land uses to growing acacia in Sumatra and Kalimantan are rubber and oil palm plantations. Taking into account the estimated annual income from rubber and oil palm based on the average land allocated by an individual household, royalties should be adjusted to at least Rp 93,438 (AUD 11) per m^3 or Rp 79,635 (AUD 9) per ton based on the conventional scenario for rubber plantation management under the traditional system.

The required adjustment will be higher if it is based on the estimated annual income for rubber using high-yield tree species. For oil palm plantations with an optimum level of productivity, the royalty adjustment should be set at a minimum of Rp 235,640 (AUD 28) per m^3 or Rp 200,829 (AUD 24) per ton. Under current benefit sharing in the FI Scheme, the community only receives royalties from 10% of the volume of the timber harvested (10% of 150 m^3 is 15 m^3/ha). Estimated annual timber benefit under current productivity received by a community household under the FI scheme is Rp 474,596, which is about 6% of the benefits received by the community participating in the WKS Scheme (see Section 5.5.4). Even though this is based on the traditional rubber system, the royalties have to be 10 times greater than the adjusted royalties based on the current estimated timber volume per ha, of Rp 934,380 (AUD 111) per m^3 or Rp 796,347 (AUD 94) per ton. To make growing timber attractive for the community, the company has to gradually increase the proportion of harvested timber allocated to the community partners. At the moment, the company has to prioritise its operations to be profitable, before it can offer a more attractive incentives scheme/package. It was only in 2009 (when the field work was conducted) that the company reached its breakeven point and had a profitable operation with increasing productivity per ha.

Types of alternative land uses	Annual net income [a]		Royalty per cum [b]		Royalty per ton [b]	
	(Rp/year/HH)	(AUD/year/HH)	(Rp/m3)	(AUD/m3)	(Rp/ton)	(AUD/ton)
a. Rubber [c]						
1. Traditional system	14,015,700	1,662	93,438	11	79,635	9
2. High yield rubber	41,647,622	4,939	277,651	33	236,634	28
b. Oil palm plantations [d]						
1. High yield productivity	35,345,992	4,192	235,640	28	200,829	24

File: CompilationJambi & Sanggau.xls - Adjustment royalty per cum

Notes:

a. Total annual net income is estimated based on EAE value per ha and total area managed for rubber plantations (5.27 ha) and oil palm plantations obtained from the survey (12.01 ha)

b. Royalties per cum were estimated based on productivity of 150 cum per ha and royalties per ton, which were estimated based on productivity of 176 ton per ha

c. Based on local practices using rubber with local species and high-yield rubber species under normal market conditions (not during global economic crisis)

d. Oil palm plantation refers to practices with high productivity, since under current low productivity, practices are not feasible.

Sources: Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009); Wulan *et. al.* (2006); BPS (1994-2009); BPS Jambi (2010); BPS Kalimantan Barat (2010) and Sulistianawati (2010).

There are valuable lessons from the development of oil palm plantations under the partnership schemes that can inform the development of the HTI programme. A company developing a timber plantation under the partnership scheme has to be able to prevent social conflicts that arise from the three potential risks affecting community partners. These risks faced by community partners in developing oil palm plantations (SETARA *et al.*, 2007; Zen *et al.*, 2008) include: (i) unsecured land ownership, (ii) the processes in determining the buying price at the farm gate for fresh fruit bunches (FFB), and (iii) the fluctuation of international prices.

With regard to the first risk (i), unsecured land ownership has been mainly caused by the requirement for households to hand over their land certificate as collateral to be used by the company to borrow funds for plantation development, and there is no certainty of an equivalent land area being returned to the community partners under the partnership scheme (see Box 6-8). With regard to (ii), the lack of a supervisory system and unclear authority for monitoring and supervision of price setting at the farm gate poses risks to adoption. The risk to a community partner arises for two main reasons. Firstly, the calculation of the buying price for the FFB is not transparent, and nor is the calculation of the repayments of the debt owed by the community partners to the company for the initial investment and planting costs (SETARA *et al.*, 2007). A lower buying price would lead to a longer period being required for community partners to pay back the credit, since their revenues are not enough to cover the payment. Secondly, middle-men were heavily involved in buying FFB from community partners, since the farmers' group (cooperative) had not been properly designated as the collector of the FFB before being sold to the company. These middle-men play a significant role in setting the buying price by taking advantage of the perishable nature of FFB, which means it has to be processed quickly or it will deteriorate.

Box 6-8. Lessons learnt from community-company partnership in oil palm plantation development

Regulatory framework for oil palm plantation development

District governments have usually produced their own regulations for supporting oil palm plantation development. For example, the Sanggau District regulation *(Perda-Peraturan Daerah)* No. 3, 2004 on implementing the development of oil palm plantation under the partnership scheme, which includes: (i) the company developing an oil palm plantation should have the consent of the land owner during the process of introducing the programme to prospective community members who may be interested in developing a plantation on their land, (ii) prospective community members have the right to receive information and access to information regarding the agreement/credit arrangements.

Land use allocation according to 80:20 proportion

From the total land handed over by community partners, 80% is allocated back to community partners and 20% for the nucleus company partner. No incentive is provided for handing over the land; however, there is a payment for replacing plants cut during land clearing as part of land preparation before planting.

Defining the buying price for the fresh fruit bunches (*Tandan Buah Segar-TBS*)

The company has the obligation to define the buying price with reference to the formulae in defining the price set by the Ministry of Agriculture that is adjusted to the price on the international market, so community partners can receive the optimal profit in accordance with the fluctuation of prices.

Notes: see also Appendix 6-1 on problems arising in the development of oil palm plantations under the partnership scheme.

Sources: Adapted from SETARA *et al.* (2007) and Zen *et al* (2008).

Lastly, with regard to risk (iii), there is a risk of price fluctuation as a result of international prices. The price community partners receive is determined by the international price for CPO (Crude Palm Oil) as defined in Ministerial Decree No.: 395/Kpts/OT.140/11/2005 on the guidelines for determining the purchase price of fresh fruit bunches (FFB), where the formula includes the international CPO price as one of the determining factors. This third risk arises because of the fluctuation of prices on the international market for CPO, which is affected by the global financial situation. During the economic crisis at the end of 2008/early 2009, when the fieldwork for this thesis was conducted, the price of FFB was at its lowest level, at Rp 300 (AUD 0.04) per kg compared to the price level before the crisis in mid-2008, at Rp 1.300-2.000 (AUD 0.15-0.24) per kg (SMERU, 2009). The limited amount of revenue from oil palm plantations during this crisis period caused instant higher pressures on the *HTI* company to accommodate an increasing demand for employment opportunities (Pers. comm., FI Company Staff, 13/01/2009).

The risk factors that exist in the oil palm partnership, as well as in developing timber plantations, need to be better understood and they should then be communicated to the local community. Prospective community partners would then better understand the benefits and risks of going into partnership in either of the two options available, oil palm or HTI plantations, before deciding to become involved. Third-party involvement is important, for example, the FDA and NGOs could play more prominent roles in initiating the process of collective learning, so that the people's assessment of these two investment alternatives could become more objective.

The discussions in this chapter have compared the advantages and disadvantages of the two tree-growing schemes inside state forests to be managed for producing timber commercially. The community-company partnership scheme has more advantages than the community tree-growing scheme for further management as small-scale commercial tree-growing. As also discussed in this chapter, there is a series of current challenges. Nevertheless, the challenges and disadvantages identified are used to formulate frameworks for improvements to be made that are economically and socially feasible, and for small-scale tree-growing management to be made commercially competitive. Improvements are proposed through policy and economic incentives to improve the competitiveness of small-scale tree-growing strategies inside state forests. Eventually, the two schemes may potentially be part of the strategies to produce timber at the national level, as discussed next in Chapter 7.

company is a joint venture of [illegible]

comm., PT Company, Stoll, [illegible]

The risk factors that exist in the oil palm [illegible]

plantations, need to be better understood by the [illegible]

the local community. The [illegible] community partnership [illegible]

the benefits and risks of joining [illegible]

oil palm or HTI plantations, before deciding [illegible]

involvement is important, for example, the HTA and NGOs could play more

prominent roles in facilitating the process of collective bargaining [illegible]

assessment of these two crops [illegible]

The discussions in this chapter have compared the oil palm and the HTI [illegible]

the two tree-growing schemes inside state forests [illegible]

commercially. The community company partnership scheme has more advantages

than the community tree growing scheme for further management [illegible]

commercial tree growing. As also discussed in this chapter, [illegible]

challenges. Nevertheless, the challenges and disadvantages [illegible]

formulate frameworks for improvements to be made that are economically [illegible]

feasible, and for smallholder tree growing [illegible]

competitive. Improvements are proposed through policy [illegible]

improve the competitiveness of [illegible]

Eventually, the tree growers may [illegible]

farmers at the regional level [illegible]

Chapter 7. The role of timber production from small-scale tree-growing in complementing national wood production

The discussion in this chapter aims to address research question 4 and its associated research sub-questions as outlined in Table 3-4 (Section 3.2 of Chapter 3). Assuming there are favourable conditions for small-scale tree-growing strategies to be developed on terms that are commercially attractive (discussed in Section 6.3 in Chapter 6), the study addresses three sub-research questions: What is the estimated potential timber production at the national level from the two existing strategies? What is the estimated potential timber that can be produced under the two strategies, considering the existing capacity of the wood processing industries? And to what extent can the timber production from small-scale tree-growing fill the gap in national wood supply and improve the livelihoods of the local growers?

Results reported here suggest that there will be a promising opportunity for timber production from small-scale tree-growing to contribute to national wood supply. It is important to first understand the nature of wood demand in Indonesia, taking into account the capacity of the wood processing industries and the extent to which the demand can be met by current timber production (Section 7.1). This identifies potential market niches for timber produced by smallholders. Results of the analyses of estimated timber production from small-scale tree-growing are discussed in Section 7.2. The discussion in this chapter takes into account potential timber production coming from private tree-growing developed on individually owned lands outside state forests, because it is also important in determining the market for wood from the two strategies for smallholder wood production being implemented inside state forests.

7.1. The nature of wood demand considering the capacity of the wood processing industries

As discussed in Section 3.3.4.2 (Chapter 3), wood demand refers to a derived demand from finished wood products used by the end-consumers. The direct consumers of wood discussed here are wood-based processing companies of various scales, such as pulp and paper companies. Tree growers under the two schemes are defined as timber producers similar to large-scale timber plantation developers, such as an *HTI* company.

For practical reasons and due to the informal nature of small-scale wood processing industries, the MoF only has statistical records of wood-based processing industries with a processing capacity equal to or more than 6,000 m^3. These larger-scale wood-based industries operate using permits granted by the Ministry of Forestry (MoF) according to regulation No. 34 (2002) (MoF, 2003a). Three major categories are mills for sawn wood, plywood, pulp and other industries, such as LVL (Laminated Veneer Lumber) (Table 7-1). The sawmill industry requires an annual timber supply of 22.09 million m^3, while plywood mills require 18.87 million m^3 and pulp mills 17.91 million m^3.

Permits for industries with an operating scale of under 6,000 m^3 are granted by the Governor as the head of the provincial government (MoF, 2003a; Greenomics, 2004b). Therefore, the MoF does not have any formal statistical records on these small-scale industries, which comprise mostly furniture and flooring industries (Triple Line Consulting, 2005; Midgley *et al.*, 2007b; ASMINDO, Undated). The wood demand of small-scale industries with an operating scale of under 6,000 m^3 data has to be estimated from other sources, such as Midgley *et al.* (2007b) and Antara (2011). However, according to a statement from the Deputy Director for Assessment of Industry Performance and Forest Product Marketing at the MoF, there is a total of 3,718 small-scale furniture and handcraft industries with a capacity of less than 6,000 m^3 (Antara Newspaper, 2011). Sixty percent of these are located primarily in Java and Bali (Antara Newspaper, 2011). Also, furniture and handicraft industries dominate most of the wood demanded by these small-scale wood-based industries (Triple Line Consulting, 2005; Midgley *et al.*, 2007b; Antara Newspaper, 2011). For the purpose of the desk study in this chapter, it is estimated that furniture and flooring industries with a capacity of less than 6,000 m^3, which mostly use teak, alone require a supply of 8.2 million m^3 annually (ITTO (2006), as cited in Midgley *et al.* (2007)). This figure could be underestimated, considering there are also furniture companies that use other timber species besides teak. However, it is difficult to find accurate data.

An annual total of 71.68 million m³ of wood is required by all of the industries, as shown in Table 7-1. On the supply side, based on an optimistic estimation of a steady annual growth of timber plantations from the *HTIs* and other sources (see Section 7.2.1), which is mostly based on MoF formal data, total national wood production could reach 42.44 million m³. On this basis, it is estimated that the gap in wood supply would be 29.24 million m³. Using a lower estimation of timber production, which is mainly estimated from data published by NGOs and other conservationist organisations, the wood gap could reach 48.88 million m³ (Indonesian Working Group on Forest Finance, 2010). As explained in Chapter 1 (Section 1.1.2), there have been inconsistencies in data from various sources, which means that calculating the wood gaps under two scenarios of timber production is well justified.

The projected wood supply gap has been a serious problem in Indonesia for more than 20 years. For example, due to inadequate timber production from industrial plantations (*HTIs*) for pulp mills, it is estimated that during 2000–2007, 72% of the total wood required by these mills has been met by MTH (Mixed Tropical Hardwood) sourced from natural forests (FWI, 2009). The furniture industries relying on teak plantations managed by Perhutani (a state-owned company) can obtain only 2.7 million m³ (33% of the demand) from its plantations, but fortunately teak from private tree growers can meet the balance (Midgley *et al.*, 2007). Further, there is an estimated standing volume of 23.4 million m³ in private tree-growing plantations in Java, and another 19.2 million m³ outside Java (see Appendix 7-10 for further discussion on lessons learnt from private tree-growing) (MoF and CBS, 2004; Nawir and Manalu, 2006; Muslich and Krisdianto, 2006; Midgley *et al.*, 2007b). Overall, it is evident that alternative strategies are necessary to increase wood supply to levels necessary to support wood processing industries in Indonesia, across a range of major products.

Table 7-1. Type of wood-processing industry, annual capacity and timber supply required, in 2010

Type of wood processing industry [a]	Σ units	Annual capacity (million m^3)	Annual timber supply required (million m^3)
1. Sawmill	1,618	11.05	22.09
2. Plywood mill	107	9.43	18.87
3. Pulp mill	6	3.98	17.91
4. Other industries [b]	150	5.23	4.61
5. Furniture & flooring [c]	3,718	0.6 [d]	8.2
Total	5,599	30.29	71.68
Round wood production			
a. Optimistic scenario			42.44 [e]
b Pessimistic scenario			22.80 [f]
Wood gaps			
a. Optimistic scenario			29.24
b Pessimistic scenario			48.88

File: Thesis\Chapter 6 New Comparisons\Market analysis\Wood gaps\Rev Summary wood gaps.xls - Sheet 2

Notes:

a. Industries recorded by the MoF with processing capacity equal to and more than 6,000 m3, except for furniture and flooring industries
b. Other industries, such as those producing veneer and LVL (Laminated Veneer Lumber)
c. Mostly using teak as the main material and mostly located in Java and Bali
d. Estimated from sales volume
e. Based on forecasting using MoF data (MoF, 2010)
f. Data from Indonesian Working Group on Forest Finance (2010).

Sources: Unless mentioned, data source is Indonesian Working Group on Forest Finance (2010).
Other sources: [c] ITTO (2006) as cited by Midgley *et al.*(2007b) and Antara (2011); [d] Suhaendi (1988) as cited in Midgley *et al.*(2007b); [e] MoF (2010d).

Estimating raw wood demand as a way to identify the size and location of potential markets in Indonesia can be done by analysing different types of wood-based production by region, including plywood, chip wood, pulp, sawn wood and veneer (Table 7-2). The potential market for pulpwood is mainly in Sumatra, where all the active pulp mills are located. For these mills, chip wood is currently produced in both Sumatra and Kalimantan. In fact, the main concentration of the production is in Kalimantan (75% of total production), which supplies the active pulp mills in Sumatra. See Appendix 7-7 for detailed distribution of production for wood chips and other types by island.

On the other hand, analysing the potential market for round wood-based timber production, timber plantation development should be focussed in the short term on where processing industries for plywood, sawn wood and veneer are located, i.e. mainly in Sumatra, Java and Kalimantan (Table 7-2). However, in the long term, incentives targeting investment for the establishment of processing industries (i.e. non-pulp based industries) should be focussed in areas where these industries are still lacking, such as in provinces in Sulawesi and Nusa Tenggara, so long as these regions have or can support the development of the necessary resource base (see Appendix 7-5 for detailed production figures of wood-processing industry for sawn wood by region).

Table 7-2. Distribution of wood-based production by types and islands [a]

No	Islands	Plywood		Chip wood		Pulp		Sawn wood		Venner	
		(000 m^3)	Proportion	(000 m^3)	Proportion	(000 m^3)	Proportion	(000 m^3)	Proportion	(000 m^3)	Proportion
1.	Sumatra	338	11%	60	6%	4,687	100%	145	20%	81	12%
2.	Java	879	29%	74	7%		-	347	49%	441	64%
3.	Bali & Nusa Tenggara	-					-		-	-	-
4.	Kalimantan	1,448	48%	759	75%	-	-	134	19%	49	7%
5.	Sulawesi	147	5%	-	-		-	7	1%	58	8%
6.	Maluku and Papua	194	6%	119	12%	-	-	77	11%	59	9%
	Total Indonesia	3,005	100%	1,013	100%	4,687	100%	710	100%	688	100%

File: C:\Users\ANawir\Documents\Thesis\Chapter 6 New Comparisons\Market analysis\ADE Charts\Summary for all types of wood.xls -Compilation

Notes: For detailed distribution by provinces see Appendix 7-1.
Source: MoF (2010c).

As discussed in this section, understanding the nature of wood-based industries is important in recommending strategies for timber production under plantation development. This allows demand-driven strategies to match timber production and markets, as discussed in Section 7.2.3 (strategies for supplying pulp wood-based industries) and Section 7.2.4 (strategies for supplying round wood-based industries).

7.2. To what extent can timber production from small-scale tree-growing fill the gap in the national wood supply and enhance local livelihoods?

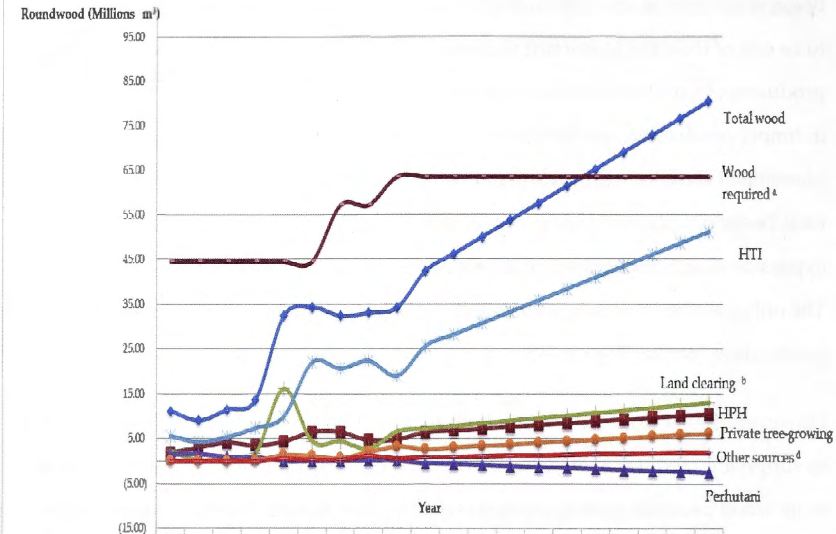
This section discusses to what extent, and under what conditions, wood from smallholder tree-growing within and outside state forests can potentially contribute to meeting the wood demand. Section 7.2.1 sets the broad national context. Section 7.2.2 discusses the scenarios used in assessing small-scale tree-growing contributions, taking into account the distribution of existing wood processing industries in different regions. Based on the scenarios outlined, strategies to support pulp wood-based (Section 7.2.3) and round wood-based industries (Section 7.2.4) are presented. The overall livelihood implications are then discussed in the last section (Section 7.2.5).

7.2.1. The current situation of national timber production

For more than three decades the main sources of timber supply in Indonesia have been from logging conducted by concession holders (*HPHs)* and land clearing, usually from timber cutting inside concession areas for developing industrial timber plantations (*HTIs*) (Nurrochmat, 2000; Indonesian Working Group on Forest Finance, 2010). However, the trend for the decade to 2020 is forecast to be a decreasing supply from the *HPHs*. An increasing trend in production is forecast for *HTIs*, private tree-growing and other sources, which are estimated to grow at 7%, 9%, and 8%, respectively, over the period 2010–2020 (Figure 7-1). The decreasing trend in timber production from *HPHs* is consistent with the decrease in *HPH* areas (Figure 7-2). The declining *HPHs* areas followed the fact that these concessions have declined to less than 150 units (Suparna, 2013). On the other hand, the areas for *HTIs*, community forestry, and private tree-growing are predicted to increase slightly. Production from *HTIs* is estimated to grow at 7% (2010–2020), which is much lower than the annual growth for the period from 2001–2009 at 24%. The 7% of growth for *HTIs'* production is consistent with the estimated annual growth in area at similar rates as can been in Figure 7-2. The areas for community tree-growing as part of the community forestry scheme are predicted to grow at 4% (2010–2020), complemented by the growth of private tree-growing area at 2%.

Besides wood production from *HTIs*, the state-owned company Perhutani is expected to be one of the most important sources of timber. However, as the analysis of timber production from Perhutani has indicated, Perhutani has yet to recover from the decline in timber production resulting from the massive scale of illegal logging of their plantations since the reformation era started in the late 1990s (Nawir *et al.*, 2003b). The total Perhutani plantation area has remained constant in Java, with little chance of expansion due to highly competitive land use in Java (Fuad, 2000; Djamhuri, 2008). The only way for Perhutani to increase its timber production is by increasing its timber productivity per ha (Figure 7-1).

However, timber production from both *HTIs* and Perhutani has usually been directed to supplying medium to large-scale wood processing companies, and left the small-scale wood processing companies to seek other wood sources, such as private tree-growing and other sources. Based on the Java cases, wood from small-scale tree-growing has a comparative advantage in supplying these small-scale industries. For example, small-scale industries prefer to buy logs from communities, because of the difficulty in bargaining with Perhutani. Other preferred advantages include: the wood price is set based on negotiation and no standardised price is applied, administration procedures are less complicated, and the distance from the trees to their markets is often shorter (Triple Line Consulting, 2005). Moreover, timber from small-scale tree plantations is not attractive for large-scale wood processing companies due to its inconsistent quality and quantity (Triple Line Consulting, 2005). Clearly, the most suitable market niche for timber coming from small-scale tree-growing would be the medium to small-scale wood processing industries.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPH	1.81	3.02	4.10	3.51	4.36	6.45	6.44	4.63	4.86	6.40	6.81	7.22	7.63	8.05	8.46	8.87	9.28	9.69	10.10	10.51
Land clearing	2.32	0.18	0.96	1.63	16.14	4.46	4.39	2.76	6.62	7.27	7.85	8.47	9.00	9.58	10.16	10.73	11.31	11.89	12.46	13.04
Perhutani	1.46	1.56	0.98	0.92	0.02	0.03	0.05	0.10	0.09	0.47	0.68	0.89	1.10	1.31	1.52	1.73	1.94	2.15	2.36	2.57
HTI	5.57	4.24	5.33	7.33	9.90	21.98	20.61	22.32	18.95	25.66	28.22	30.77	33.32	35.87	38.42	40.97	43.52	46.07	48.62	51.17
Private tree-growing	0	0	0.06	0.15	1.32	1.11	0.61	2.01	3.21	2.68	3.03	3.38	3.73	4.08	4.43	4.78	5.12	5.47	5.82	6.17
Other sources	0	0	0	0	0.65	0.30	0.29	1.23	0.53	0.89	1.00	1.11	1.22	1.34	1.45	1.56	1.67	1.78	1.89	2.00
Total wood	11.16	9.00	11.42	13.55	32.39	34.32	32.40	33.05	34.25	42.44	46.23	50.02	53.80	57.59	61.38	65.17	68.95	72.74	76.53	80.31
Wood required	44.5	44.5	44.5	44.5	44.5	44.5	57.1	57.1	63.48	63.48	63.48	63.48	63.48	63.48	63.48	63.48	63.48	63.48	63.48	63.48

File: File: Chapter 6 New Comparisons\Market analysis\Wood production & area\Bahan regresi Chart with others - Final Prod kayu-Sumber

Period	Annual growth in round wood production by sources (%)						
	HPH	Land clearing [b]	Perhutani	*HTI*	Private tree-growing [c]	Other sources [d]	Total
2001-2009	19%	148%	-64%	24%	162%	31%	22%
2010-2020 [e]	5%	6%	19%	7%	9%	8%	7%
2001-2020	12%	73%	-20%	15%	64%	19%	14%

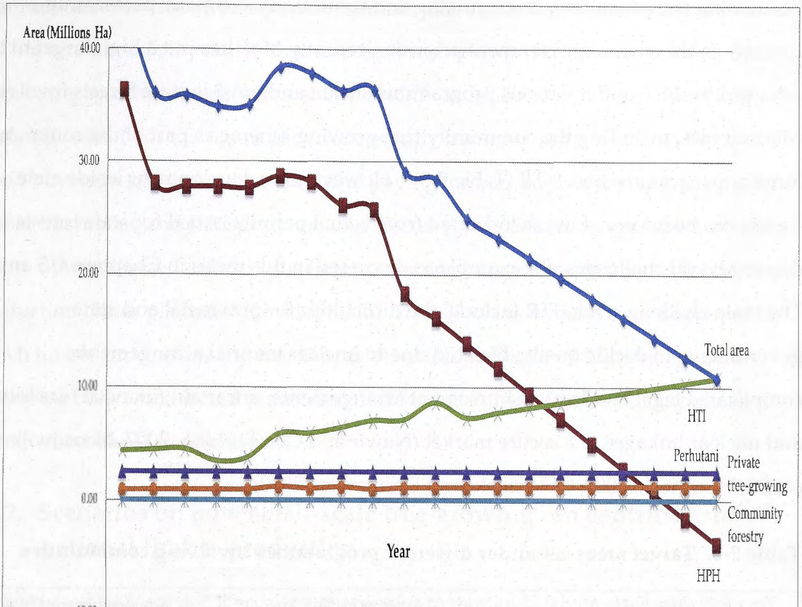
: Chapter 6 New Comparisons\Market analysis\Wood production & area\Bahan regresi Chart with others - Final Prod kayu-Sumber Forecast

Notes:

a. Wood required refers to total volumes required by all industry types
b. Land clearing includes timber cutting inside concession areas used for forestry plantation development under *HTIs* development programme
c. Private tree-growing refers to trees harvested from privately owned individual land outside state forests
d. Other sources include: imported round wood, wood from estate crop plantations (e.g. rubber wood), traders and other rights to harvest timber (e.g. under community forestry programme or *HKm*)
e. Estimation on round wood in this period is based on the forecasting data on round wood supply for the period 2001–2009, except for *HTIs* that used time series data from 1997–2009.

Sources: Analysed from MoF (2004d; 2010d); Ministry of Environment (2007); Manurung (2009); Indonesian Working Group on Forest Finance (2010).

Figure 7-1. Forecast wood production under different strategies (2001–2020)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPH	36.42	28.08	27.80	27.82	27.72	28.78	28.27	26.16	25.77	18.33	16.12	13.91	11.70	9.49	7.28	5.07	2.86	0.65	-1.56	-3.77
HTI	4.40	4.50	4.58	3.52	3.80	5.91	5.97	6.47	7.09	7.15	8.67	7.33	7.77	8.20	8.64	9.07	9.51	9.94	10.38	10.81
Perhutani	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57
Community forestry	0.001	0.013	0.010	0.007	0.003	0.003	0.002	0.0002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Private tree-growing	0.97	0.98	0.99	1.00	1.00	1.22	1.09	1.19	1.02	1.14	1.15	1.16	1.18	1.19	1.21	1.22	1.24	1.25	1.26	1.28
Total	44.35	36.14	35.94	34.91	35.09	38.47	37.90	36.39	36.45	29.18	28.51	24.97	23.21	21.45	19.69	17.93	16.17	14.41	12.65	10.89

File: Chapter 6 New Comparisons\Market analysis\Wood production & area Bahan regresi\Chart with others.xls - FIN Areas Chart

Period	Annual growth in area (%)					
	HPH	*HTI*	Perhutani	Community forestry	Private tree-growing [a]	Total
2001-2009	-4%	7%	0%	-41%	1%	-2%
2010-2020 [b]	-42%	4%	0%	4%	2%	-10%
2001-2020	-24%	7%	0%	-12%	2%	-7%

File: Bahan regresi Chart with others - Final Prod kayu-Sumber GROW (3)

Notes:

a. Private tree-growing refers to privately owned individual land outside state forests (extensively covered in the literature, e.g. see Hindra (2006) and ARuPA (2002a)

b. Estimation was based on the forecasting using data for the period 2001–2009, except for *HTIs* for which time series data was used from 1997.

Sources: Analysed from MoF (2001c; 2004d; 2010d) and Hindra (2006).

Figure 7-2. Forecast annual growth of timber plantation area (2001–2020)

Positioning the community tree-growing and community-company partnership schemes in the current government priorities, recently MoF has put a high target to be achieved by 2015 under various programmes inside and outside state forests involving communities, including the community tree-growing scheme as part of the community forestry programme and *HTR* (Table 7-3). However, the development inside state forests has been very slow, as indicated from actual permits issued for state forests, due to several challenges, for example as discussed in this thesis in Chapters 4, 5 and 6. The main challenges for *HTR* include: the difficulties for provincial and state governments to decide on eligible land due to unclear tenurial arrangements, complicated legal and loan disbursement arrangements; uncertain financial feasibility; and unclear linkages to a secure market (Nawir and ComForLink, 2007; Noordwijk *et al.*, 2007; Schneck, 2009; Obidzinski and Dermawan, 2010).

Table 7-3. Target areas set under different programmes involving communities

Programmes [a]	Target set for 2015 (Ha)		Actual development (Ha)	
	Total area	Annual target	Allocated by MoF [b]	Permit issued [c]
1. Community based forestry plantation *(HTR)*	5,400,000	1,400,000 [d]	383,403	35,575
2. Village forest *(Hutan Desa)*	2,100,000	500,000	14,346 [e]	10,310
3. Community forestry *(HKm)*	2,100,000	500,000	80,395	34,615
4. Private tree-growing *(Hutan Rakyat)*	2,000,000	-	1,700,000 [f]	-

File: Chapter 6 New Comparisons\Market analysis\Wood gaps\Summary wood gaps.xls - MoF target

Notes:

a. Programmes No. 1 to No. 3 are implemented inside state forests, No. 4 is implemented as part of the expansion programme on privately owned land outside state forests
b. Allocated following approved proposal submitted to MoF (Ministry of Forestry)
c. Permit confirming the management rights issued by the Head of the District (Bupati)
d. Target for the first four years, in the fifth year: 1,200,000 ha
e. From a total area verified by MoF of 119,757 ha
f. Refers to actual area planted.

Sources: Kaban (2009); MoF (2010d); and Partnership for Governance Reform (2011).

There have been overly high expectations from central government of community interest and capacity to invest and develop tree plantations inside state forests. Central government policy and regulations for community tree-growing have assumed that communities would be able to invest in timber plantation development. As discussed in Chapters 4 and 5, in reality, these expectations were not realistic considering the costs borne by other stakeholders, such as NGOs as facilitators in the processes of applying to MoF for the rights under community tree-growing scheme, and/or by wood buyers in taking responsibility and paying for administrative requirements for timber harvesting and transportation. As discussed in this section, understanding the nature of wood-based industries is important in recommending strategies for timber production under plantation development. This allows demand-driven strategies to match timber production and markets, as discussed in Section 7.2.3 (strategies for supplying pulp wood-based industries) and Section 7.2.4 (strategies for supplying round wood-based industries).

7.2.2. Scenarios on how small-scale tree-growing can contribute to national timber production

As discussed in Section 7.1, scenarios here refer to demand-driven strategies defined by the industry characteristics in producing wood-based products. The scenarios are mainly developed by defining interventions of the two main small-scale tree-growing strategies implemented inside state forests as the focus of this thesis, i.e. community tree-growing and community-company partnership schemes. However, to give a comprehensive overview, the analysis also includes tree-growing developed on privately owned lands, in consideration of its important potential roles in the national wood supply. Scenarios for community tree-growing and community-company partnerships that are able to produce timber optimally are based on the following important assumptions:

a. **Assumptions about improved community tree-growing as part of community forestry (*HKm*)**

There are four specific assumptions:

(i) It is possible to convert the *HKm* rights, particularly on degraded lands, to *HTR* rights. This is important mainly to make sure that a community has full rights to manage the land, including the right to harvest by the end of the rotation cycle. This will ensure community members receive optimum economic benefits.

(ii) It is important to make sure that every *HTR* management unit is engaged with wood processing industries under a mutually beneficial timber buying contractual agreement to secure a market for the timber produced. Priority should be given to the wood processing industries located at the most economically feasible distance from the plantation. For example, acacia plantations can be anywhere between 100 and 200 km from the pulp processing plant (Nawir and ComForLink, 2007). The engagement with the industries will also define the timber species to be planted in community plantations.

(iii) Timber-buying contractual agreements prioritise community member groups which have well-developed management and financial capacity.

(iv) Community members who do not have adequate capacity will have to enter a partnership with companies, such as *HTIs* and other investors in timber plantations. It is expected there will be a transfer of knowledge and skills from the company to improve the management and financial capacities of community partners.

b. Assumptions about improved community-company partnerships

There are three specific assumptions:

(i) Community members who have been involved in partnerships inside concession areas can apply for their own concessions under the *HTR* scheme, so the community has more secure rights for managing the plantation commercially, as well as securing a market with a suitable industry. Priority should be provided to community partners who have developed advanced management and financial capacities.

(ii) In complementing acacia plantation development under partnerships, community members who have the land near a pulp processing plant and/or company concessions can be part of a private tree-growing development.

(iii) Community concession areas under *HTR* arrangements that are being converted from claimed areas inside a company concession should be allowed to swap it for other land inside state forests, which are unencumbered by other granted rights, as approved by MoF.

c. Assumptions about all small-scale tree-growing (for both community tree-growing and community-company partnerships, and other schemes such as *HTR*)

There are four specific assumptions:

(i) The focus of developing small-scale tree-growing inside state forests is on degraded land totalling 79.97 million ha (Baplan, 2002a; 2008). Degraded areas inside state forests can potentially be developed as small-scale tree-growing through various schemes: *HKm* or community-company partnerships or *HTR* (see Appendix 7-11 and 7-12 for data on distribution across regions and provinces).

(ii) Figures for potential areas for plantation development on privately owned land totalling 9.43 million ha are based on figures produced by MoF and CBS (2004) that include *Potensi Hutan Rakyat Indonesia-PHRI 2003* (The farm forestry potential in Indonesia in 2003) (see Appendix 7-2).

(iii) Under different schemes for small-scale tree-growing, it is possible to define and to apply specific procedures and regulations for community-owned plantations that are different from procedures and regulations applied for industrial timber plantations.

(iv) There is a conducive policy framework that is effective in reducing transaction costs for smallholders consistent with the different requirements of various programmes, such as *HKm* and *HTR*, and procedures applied for harvesting, marketing and transporting timber produced under various schemes, including private tree-growing.

Scenarios are developed by focussing on the two general categories of timber that are required by the closest wood industries to the locations of the small-scale commercial tree-growing areas as the most feasible options. The two general categories include plantations producing timber for: (1) pulp wood-based industries, (2) round wood-based industries that can be further specified into two sub-groups based on commercial values as defined in MoF (2003a), high commercial values (e.g. teak), and low commercial values, such as paraserianthes *(Paraserianthes falcataria)*. The distribution of plantations for the two timber species across different provinces is determined by the existence of the wood industries (see Appendix 7-1 for detailed distribution of wood-based production and Section 7.2.3 and 7.2.4 for further discussion).

7.2.3. Timber production from small-scale tree-growing as part of the strategies for supporting pulp wood-based industries

The main pulp processing plants are located in three provinces in Sumatra, which are: Jambi, North Sumatra and Riau. There has not been any significant activities in any pulp-based processing plant in Kalimantan (Pirard and Cossalter, 2006). Therefore, wood production from plantations in Kalimantan must be shipped to Sumatra, even though transportation costs and the risk of losing the timber in transit could be the main challenge to having cost-effective production at the other end (FI Company staff 2, pers. comm., 14 January 2009). For the neighbouring provinces that do not have the pulp-based processing mills, timber produced from plantations is processed quickly into wood chips, such as proposed here in the scenario for the case of South Sumatra Province (Table 7-4).

Table 7-4. **Scenarios for timber production under strategies for small-scale tree-growing: pulp wood-based industries**

Focus of wood production in different regions [a]	Potential schemes on degraded areas and type of production					
	HKm or community-company partnership scheme or *HTR* inside state forests			Private tree-growing or community-company partnership scheme on privately-owned lands		
	Provinces	Area (million ha)[b]	Type of production [c]	Provinces	Area (million ha)[b]	Type of production [c]
Sumatra	Jambi	1.58	Pulp production	Jambi	1.26	Pulp production
	North Sumatra	3.08		North Sumatra	0.22	
	Riau	5.32		Riau	1.11	
	South Sumatra	5.84	Wood chips [d]	South Sumatra	2.67	Wood chips [d]
	Total Sumatra	**15.82**		Total Sumatra	5.26	
Kalimantan	East Kalimantan	4.89	Wood chips [e]	East Kalimantan	0.06	Wood chips [e]
	South Kalimantan	0.33	Wood chips [e]	South Kalimantan	0.07	Wood chips [e]
	West Kalimantan	0.82	Wood chips [e]	West Kalimantan	0.03	Wood chips [e]
	Total Kalimantan	**6.05**		Total Kalimantan	0.16	
Total Sumatra & Kalimantan		**37.69**		**Total**	**5.42**	

File: Chapter 6 New Comparisons \ Market analysis \ Gabungan analisa \ Results gabungan.xls - Fin Summary table scenarios (4)

Notes:

a. Focuses on Sumatra (where the locations of pulp mills are located) and Kalimantan (the nearest to Sumatra)
b. Areas inside state forests are degraded lands (Baplan, 2002a, 2008) and areas outside state forests are from potential farm forestry development (MoF and CBS, 2004) (see Appendix 7-12)
c. Type of production was defined based on the current existing industries available in each province and as indicated by the type of wood-based production, data published by MoF (2010)
d. Wood chips for supplying pulp mills in the neighbouring provinces, such as in Jambi, Riau and North Sumatra
e. Wood chips for supplying pulp processing plants in Sumatra; however, the transportation cost is the main challenge.

Sources: Analysed from MoF (2001c; 2004d; 2010d) and MoF and CBS (2004).

Based on the key locations of pulp mills, the development of timber plantations by using fast-growing species, such as acacia and/or eucalyptus, inside state forests on degraded forest areas should be prioritised in Jambi, North Sumatra, Riau and South Sumatra with a total area of 15.82 million ha (Table 7-4). In Kalimantan, the allocation of degraded forest areas for planting fast growing species should be concentrated in East, South and West Kalimantan. The total area inside state forests that can potentially be allocated for small-scale commercial tree-growing for acacia and/or eucalyptus is 6.05 million ha.

In addition to areas that can be potentially developed as part of the state forest management plan, there are another 5.26 million ha in Sumatra and 164 thousand ha in Kalimantan on privately owned land outside state forests that can be allocated to timber plantation for wood chips used for pulp production (Table 7-4). However, if there is no guaranteed market in Sumatra, there is only a small possibility that private tree-growing in Kalimantan can be further developed, because of production costs such as buying the seedlings and transportation costs to mills in Sumatra, unless processing industries are developed locally Therefore, the most promising development scheme is to develop areas on privately owned lands under community-company partnership schemes, which is less complicated than developing similar schemes with land claimants inside state forests (as discussed in Chapter 5, Section 5.3). In this case, having more prominent intervention from central and local governments to provide the appropriate incentives and linking the growers and companies that are interested should be prioritised.

7.2.4. Timber production from small-scale tree-growing as part of the strategies for supporting round wood-based industries

Unlike the pulp mills located only in Sumatra, the round wood-based industries (with a capacity equal and more than 6,000 m^3) are scattered in different provinces on a number of islands (see detailed information in Appendix 7-1). Commonly, round wood is processed as sawn wood, since this can be further processed into various wood products, such as furniture, sawn wood and plywood. As indicated from the distribution of wood products across different provinces (Figure 7-2), most of the processing industries producing sawn wood are concentrated in Java, Sumatra and Kalimantan. The islands of Sulawesi, Maluku and Papua do not have a large capacity for wood-based processing industries for sawn wood, neither do Bali and Nusa Tenggara. Similar patterns are also evident for veneer and plywood production.

Taking into account the location of wood processing industries in the current situation, scenarios are designed for small-scale commercial tree-growing that can be developed inside state forests as well as on privately owned land outside state forests (Table 7-5). For timber that has a high commercial value such as teak, the concentration of planting should be in Java, Sulawesi, Bali and Nusa Tenggara, where most of the processing industries are located. For example, these are furniture and handicraft industries with the capacity less than 6,000 m^3. In Java, teak plantations should be focussed on East and Central Java Provinces where the furniture industries are mainly located. Currently, there is a total area of 3.30 million ha of plantation teak. In addition to this, another potential 550 thousand ha of privately owned land outside state forest could be allocated to teak plantations.

There are similar reasons for prioritising development in Bali, where handicraft and furniture industries are also located. A teak supply from the neighbouring provinces of West and East Nusa Tenggara could support these industries. The total potential area that could be developed is 4.03 million ha, in addition to 220 thousand ha on privately owned land. In Sulawesi, the development focus should be in Southeast Sulawesi, where teak plantations have been developed by local people facilitated by an NGO (i.e. Jauh) and local FDA, and the marketing has been facilitated by Tropical Forest Trust (TFT) based in Semarang, Central Java. For further discussion, for example see in Midgley *et al.* (2007b). The total potential area for small-scale tree-growing for the whole of Indonesia, inside and outside state forests, is 1.54 million ha and 30 thousand ha, respectively.

Table 7-5. Scenarios for timber production under small-scale commercial tree-growing strategies: round wood with high commercial value

Focus of wood production in different regions [a]	Potential schemes on degraded areas and type of production: round wood with high commercial value					
	HKm or community-company partnership scheme or *HTR*			Private tree-growing or community-company partnership		
	Provinces	Area (million ha)[b]	Type of production [c]	Provinces	Area (million ha)[b]	Type of production [c]
Java	East Java	1.84	Sawn wood for furniture	East Java	0.23	Sawn wood for furniture
	Central Java	1.46		Central Java	0.32	
	Total Java	3.30		Total Java	0.55	
Sulawesi	Southeast Sulawesi	1.54	Sawn wood for furniture	Southeast Sulawesi	0.03	Sawn wood for furniture
Bali and Nusa Tenggara	Bali	0.30	Small-scale handicraft and furniture industries	Bali	0.07	Small-scale handicraft and furniture industries
	East Nusa Tenggara	0.93		East Nusa Tenggara	0.07	
	West Nusa Tenggara	2.80		West Nusa Tenggara	0.07	
	Total Bali and Nusa Tenggara	4.03		Total Bali and Nusa Tenggara	0.22	
Total Indonesia		12.16		Total	0.80	

File: Chapter 6 New Comparisons\Market analysis\Gabungan analisa\ Results gabungan.xls - Fin Summary table scenarios (4)

Notes:
a. The category for high and low commercial value adapted from the MoF Decree No. 163/Kpts-II/2003
b. Areas inside state forests are degraded lands (Baplan, 2002a, 2008) and areas outside state forests are from potential farm forestry development (MoF and CBS, 2003). See further in Appendix 7-12.
c. Type of production was defined based on the current existing industries available in each province and as indicated by the type of wood-based production data published by MoF (2010.
Sources: Analysed from Baplan (2002a, 2008), MoF and CBS (2003), and MoF (2010).

Taking into account the distribution of existing wood processing industries, production of wood of lower commercial value, such as paraserianthes and gmelina, should be focussed in Java, Sumatra, Kalimantan, Sulawesi, Maluku and Papua (Table 7-6). In Java, this should be in West Java, in which most of the processing industries using this type of timber are located. The total potential area inside state forest is 1.45 million ha, and another 80 thousand ha outside state forests.

Kalimantan has the highest potential area inside state forests (26.73 million ha) that could be developed under small-scale commercial tree-growing either through *HKm*, community-company partnerships, or *HTR*. The lowest potential area is in Java with a total area of 9.07 million ha. In Sumatra, the development of small-scale commercial tree-growing for wood with low commercial value should focus on Aceh, Bangka Belitung, Bengkulu, Lampung and West Sumatra with a total of 9.07 million ha. In the same provinces, excluding Bangka Belitung, where no potential areas for private tree-growing have been identified, there is a total of 1.13 million ha outside state forests that could be developed.

In Sulawesi, industries can only be identified in South Sulawesi, and no other industries are identified in other provinces. For the time being, before industries can be set up in the neighbouring provinces of Central, West, and North Sulawesi and Gorontalo, the timber produced can potentially supply the needs of industries in South Sulawesi. In the future, industries will need to be established strategically in other provinces in Sulawesi if tree-growing, especially on privately owned land, is to be stimulated. In Papua, due to a high proportion of natural forest, no degraded forests have yet been identified; there is no potential area that can be developed as plantations under small-scale commercial tree-growing. Papua still has abundant natural forests; however, it is noted that the existing industries have a total capacity of 3,782,536 m^3 (for plywood, veneer, chip and sawn woods), which is similar to the total capacity for all provinces in Java (4,377,130 m^3) (MoF, 2010c). To reduce the pressure on natural forests to supply timber for the existing industries, it is crucial to have a better strategy to develop private tree-growing optimally by mapping potential areas and to develop a proper database as the basis for further planning.

Table 7-6. Scenarios for timber production under small-scale commercial tree-growing strategies: round wood with low commercial value

Focus of wood production in different regions [a]	Potential schemes on degraded areas and type of production: round wood with low commercial value					
	HKm or community-company partnership scheme or *HTR*			Private tree-growing or community-company partnership		
	Provinces	Area (million ha)[b]	Type of production [c]	Provinces	Area (million ha)[b]	Type of production [c]
Java	West Java	1.45	Plywood, veneer, chipwood & sawn wood	West Java	0.08	Plywood, veneer, chipwood & sawn wood
Sumatra	Aceh	2.34	Sawn wood [d]	Aceh	0.14	Sawn wood [d]
	Bangka Belitung	1.24		Bangka Belitung	n.a	
	Bengkulu	1.18	Veneer	Bengkulu	0.15	Veneer
	Lampung	2.24	Plywood, veneer & sawn wood	Lampung	0.48	Sawn wood [d]
	West Sumatra	2.07	Sawn wood [d]	West Sumatra	0.36	
	Total	9.07		Total	1.13	
Kalimantan	Central Kalimantan	11.13	Plywood, venner & sawn wood	Central Kalimantan	0.0003	Plywood, venner & sawn wood
	East Kalimantan	5.45		East Kalimantan	0.07	
	South Kalimantan	1.32		South Kalimantan	0.30	
	West Kalimantan	8.83		West Kalimantan	0.31	
	Total	26.73		Total	0.68	
Sulawesi	Central Sulawesi	3.08	Industries have to be set-up, e.g. for sawn wood supplying industries in South Sulawesi	Central Sulawesi	0.14	Industries have to be set-up, e.g. for sawn wood supplying industries in South Sulawesi
	North Sulawesi & Gorontalo	1.36		North Sulawesi & Gorontalo	0.14	
	West Sulawesi	-		West Sulawesi	-	
	South Sulawesi	3.78	Plywood, venner & sawn wood	South Sulawesi	0.68	Plywood, venner & sawn wood
	Total	8.21		Total	0.96	
Maluku & Papua	Maluku	2.00	Veneer and sawn wood	Maluku	0.003	Veneer and sawn wood
	Maluku Utara	1.58	Veneer and sawn wood	Papua [e]	0.04	Plywood, veneer, chipwood
	Total	3.58		Total	0.04	
Total Indonesia		93.04		Total Indonesia	2.67	

File: Chapter 6 New Comparisons\Market analysis\Gabungan analisa\ Results gabungan.xls - Fin Summary table scenarios (4)

Notes:

a. The category for high and low commercial value adapted from the MoF Decree No. 163/Kpts-II/2003.

b. Areas inside state forests are degraded lands (Baplan, 2002a, 2008) and areas outside state forests are from potential farm forestry development (MoF and CBS, 2003). See further in Appendix 7-12.

c. Type of production was defined based on the current existing industries available in each province and as indicated by the type of wood-based production data published by MoF (2010).

d. Producing sawn wood is the first option, since no other industry for other types of production is being setup.

e. Papua still has an abundance of natural forests; more detailed survey to map potential areas to be developed as private tree-growing is essential.

Sources: Analysed from Baplan (2002a, 2008), MoF and CBS (2003), and MoF (2010).

7.2.5. Potential contribution to the national timber production

As discussed in Section 7.2.3 and Section 7.2.4, different schemes of small-scale commercial tree-growing on degraded land inside state forests can potentially contribute to the national wood supply to meet industry requirements for wood (Table 7-7). A total of 21.87 million ha inside state forests could potentially produce 547 million m^3 per year or about 31 times the total yearly wood requirement of all pulp and paper mills in three provinces in Sumatra. Private tree-growing could potentially supply eight times the wood requirement of the same industries.

The high-value round wood production from teak is assumed to fill the wood demand from the furniture industries. Small-scale commercial tree-growing inside state forests on degraded land can contribute up to five times the wood required, complemented by 2-3 million m^3 per year from wood from privately owned land outside state forests. It is important to note that this wood production would be in addition to the existing estimated supply of wood from private tree-growing areas at 42.64 million m^3 for all species, including teak, mahogany, and rosewood (MoF and CBS, 2004) (see discussion in Appendix 7-10).

Production from low commercial value round wood could contribute to the supply for sawmills, plywood mills, and other industries, such as veneer. The small-scale commercial tree-growing inside state forests can contribute up to 19 times the current wood supply and could be complemented by double the wood production from new privately owned lands. A total estimated wood production inside state forests of 1,458 million m^3 could contribute 50 times the current wood supply and be complemented by an additional supply of up to six times the current supply from wood produced from privately owned land.

Table 7-7. **Estimation of potential wood production from small-scale commercial tree-growing and its contribution to the wood supply for the wood processing industries in Indonesia**

Focus of wood production in different regions	Potential schemes for development considering potential areas and existing industry capacity			
	HKm or community-company partnership scheme or *HTR* inside state forests [a]		Private tree-growing or community-company partnership scheme on privately-owned lands	
	Areas (million ha)	Wood production (million m³/year)	Areas (million ha)	Wood production (million m³/year)
A. Scenario 1: Optimal productivity per ha [b]				
1. Pulp wood production (e.g. acacia)	21.87	547	5.42	136
2. Round wood with high commercial values (e.g. teak)	8.86	38	0.80	3
3. Round wood with average commercial values (e.g. *Paraserianthes falcataria*, pine)	49.03	873	2.67	48
Total	79.76	1,458	8.89	186
Contribution to total wood gaps [c]		50 times		6 times
B. Scenario 2: Low productivity per ha [d]				
1. Pulp wood production (e.g. acacia)	21.87	273	5.42	68
2. Round wood with high commercial values (e.g. teak)	8.86	19	0.80	2
3. Round wood with average commercial values (e.g. *Paraserianthes falcataria*, pine)	49.03	437	2.67	24
Total	79.76	729	8.89	93
Contribution to total wood gaps [c]		25 times		3 times

File: Chapter 6 New Comparisons\Market analysis\Gabungan analisa\Results gabungan.xls - Fin est total production 2 scen

Notes:

a. Under *HKm*, based on MoF regulation, only 70% of the total area can be used for timber (see Section 4.2 of Chapter 4 for further discussion).

b. Productivity per ha for: pulp wood production based on acacia is 150 m³/ha; round wood with high commercial value based on teak is 85 m³/ha; and the wood production for round wood with low commercial value, of different timber species, such as paraserianthes and pine is based on the average productivity of 89 m³/ha.

c. Productivity per ha for: pulp wood production based on acacia is 75 m³/ha; round wood with high commercial value based on teak is 43m³/ha; and the wood production for round wood with low commercial value, of different timber is 45 m³/ha.

Sources: Analysis on acacia is based on Nawir *et al.* (2003b) and Anonymous (2009a); teak is based on Orwa (2009); mixed timber productivity is based on MoF and CBS (2004).

As discussed in Section 4.4 of Chapter 4 and Section 5.5 of Chapter 5, income from small-scale tree-growing can potentially have important roles in local community livelihood strategies. An analysis of the impact on local livelihoods of how small-scale tree-growing might contribute to national wood production was conducted here, taking into account the total number of households that maybe involved (Table 7-8).

It is estimated that there are more households involved in tree-growing from mediocre to low commercial value (2.35 million households) than those who are involved in tree-growing to produce high commercial value wood (425,157 households). This is because it is much easier to grow and manage other timber species than teak; for example, teak requires a particular climate and soil for optimum growth and requires a proper silvicultural practice, such thinning and pruning, to produce a high quality round wood. For example, it grows best on deep, well-drained and fertile soils, especially on volcanic substrata such as igneous and metamorphic soils or on alluvial soils of various origins, and the optimal soil pH is between 6.5 and 7.5 with the calcium content of the soil high (Kaosa-ard, 1998). Further, teak seedlings are more expensive compared to more general timber species, such as paraserianthes or gmelina.

Using estimated timber income received from different wood production in different regions, the total estimated generated income for all tree-growing households reached Rp 33.17 trillion (AUD 3,934 million), for the optimal scenario with optimal productivity. At lower of participation and productivity, income was estimated at Rp 8.29 trillion (AUD 983 million). At the optimal level, the total estimated benefit received by households is about one-tenth of the total actual MoF revenues from taxes and grants in 2009, which was Rp 396.21 trillion (AUD 46.99 million) (MoF, 2009c). However, at a lower level, estimated household benefits only accounted for 2% of the total MoF revenues in the same year (MoF, 2009c). The comparisons have shown that the impacts of timber production at the national level could have significant roles in improving local livelihoods. In addition, there are multiplier effects that potentially can be generated, such as job opportunities in wood-based processing industries, as well as business opportunities along the market chains at local and national levels.

Table 7-8. Possible impacts of greater wood production from small-scale tree-growing on the livelihoods of participating households

Tree growing for different wood production in different regions	Total forestry households involved [a]	Estimated total annual timber income for all households [c]			
		Optimal scenario [d]		Modest scenario [e]	
		Rp (trillion)	AUD (million)	Rp (trillion)	AUD (million)
1. Pulp wood	272,506 [b]	1.26	150	0.32	37
2. High commercial value wood	425,157	2.94	349	0.74	87
3. Mediocre to low commercial value	2,352,337	28.96	3,435	7.24	859
Total	3,050,000	33.17	3,934	8.29	983

File: Chapter 6 New Comparisons\Market analysis\Gabungan analisa\Results gabungan.xls - Estimated LIV impacts (4)

Notes:

a. The estimated number of households involved in different tree-growing for different wood species based on the allocation of areas used, in which the number of households is weighted by allocation of areas allocated for: pulp wood, high commercial value wood, and mediocre to low commercial value.
b. Includes those who are involved in community-company partnerships.
c. Estimated income per household per year was based on the results of the analysis in Chapter 4, 5 and other references. See Appendix 7-13 for detailed information on annual income per household.
d. Optimal scenario: including all of the forestry households with an optimal productivity.
e. Modest scenario: only 50% of the households are included with 50% lower timber productivity.

Sources:

a. MoF and CBS (2003).
c. In addition to the results of the analysis as discussed in Chapter 4 and 5, additional data was adapted from: FORDA *et al.* (2007); and Jariyah and Wahyuningrum (2008).

7.3. Conclusions

The analyses suggest a substantial gap between supply and demand for the two major categories of wood products in Indonesia, specifically pulp-based and round wood timber. The extent of the gap depends in part on the level of natural forest conversion and harvesting for pulpwood, and for both it depends on the extent to which imports might fill the gap. However, the size of the gap in each case is so large that it seems likely that smallholder tree-growing, developed according to the criteria discussed in Chapter 6, could expand significantly. Such an expansion would need to be directed at supplying wood-processing enterprises competitively and also to address the local livelihood issues, as discussed.

Chapter 8. Conclusions

This thesis focuses on the two main strategies for small-scale commercial tree-growing inside state forests in Indonesia: first, *Hutan Kemasyarakatan (HKm),* commonly translated in the Indonesian literature as a 'community forestry scheme' and referred to here as 'community tree-growing scheme'; and, second, the *Kemitraan,* or community-company partnership scheme. The underlying rationale motivating the research in this thesis is that strategies for smallholder tree-growing in Indonesia have not been developed optimally, due to two main identified problems. Firstly, there has been a lack of understanding about the overall socioeconomic characteristics of small scale tree-growing management inside state forests, particularly the interconnected impediments concerning management, socioeconomic and policy aspects, as well its relative advantages in comparison to other investment options. Specifically, this has happened under conditions in which the implications of the proposed policy and economic incentives for small-scale tree-growing development have often been counter-productive to its competitiveness. Secondly, the potential timber contribution to the national wood supply for specific market niches has not been identified, despite recognition of the unique characteristics and the relative advantages of small-scale tree-growing management and products. Therefore, the aim of this research is to identify strategies which will inform policies to enhance the implementation of commercial tree-growing by farmers and communities in Indonesia. The research is guided by four overarching research questions, which the thesis addresses based on case study analysis:

1. What are the advantages and disadvantages of the two current schemes?
2. What are the benefits and costs, in both social and economic terms, of the two existing schemes in comparison to other investment options using the same lands?
3. How does this analysis suggest policies and schemes to promote small-scale commercial tree-growing in Indonesia should be designed?
4. How does this information and analysis inform decision-makers on the potential contribution of timber from small-scale commercial tree-growing to the wood production strategies in Indonesia?

The conceptual framework, designed as discussed in Chapter 2, has been very useful and effective in guiding the research to address the four research questions. The two components of the conceptual framework were the framework for analysing the feasible management of small-scale commercial tree-growing, and the framework required to assess favourable conditions for the tree-growing to be more commercially competitive. The research was implemented using comparative quantitative and qualitative analysis. Qualitative analysis was used to analyse the institutional, tenurial and management arrangements, and the overarching policy framework that complemented Cost Benefit Analysis (CBA) was used as the main quantitative method of analysis. However, this research has several limitations as has been explained in Section 1.4 in Chapter 1 and Section 3.5 in Chapter 3. One of the main limitations was the lack of opportunity to verify the assumptions and final results with the broader range of stakeholder groups, and limitations on the scope of field work conducted during the PhD, which could be conducted only at two sites of the community-company partnership scheme in Jambi and West Kalimantan. Also, developing scenarios for national wood production strategies based on analysis from only four case study sites was necessarily somewhat challenging. However, the overall methodological approach used for the four stages of analysis can be replicated using more case studies.

Small-scale tree-growing in this thesis is defined as the management of tree plantations, as either or both common or individual property, with the aim of achieving multiple objectives, including the sharing of the economic benefits. Small-scale commercial tree-growing, which is the focus in this thesis, refers to the subset of those growers who have already adopted small-scale tree-growing in their livelihood strategy and who aim eventually for commercial production to get the most favourable socio-economic benefits possible, in comparison to other economic alternatives using the same resources of land and other capital outlays (e.g. labour).

This chapter synthesises the main research findings and recommendations for future study as guided by these four research questions. Section 8.1 addresses research question 1 by discussing the advantages and disadvantages of the two schemes. Section 8.2 addresses research question 2, on the comparison between the benefits and costs of the two existing schemes with other investment options. Both these sections are based on case study and on comparative analysis. Section 8.3 addresses research question 3, based mainly on the results of comparative analysis, which focuses on the recommendation to design small-scale commercial tree-growing at the national level. Research question 4 is addressed in Section 8.4, based mainly on the production scenarios presented in Chapter 7. Section 8.5 provides the concluding remarks and final recommendations for future study, focussing on practical implications.

8.1. What are the advantages and disadvantages of the two current schemes?

This section discusses and compares the relative advantages and disadvantages of the two schemes, as well as the comparisons to the claims made for tree-growing practices. In particular, the synthesis of the study in this thesis has produced some challenges to claims made by scholars about the factors they perceive to be affecting the development and commercial management of small-scale tree-growing, as discussed below. One of the main reasons for these challenges is that the analysis in the thesis focussed on small-scale tree-growing development inside state forests, a uniquely Indonesian situation, while most of the discussions in the literature are focussed on tree-growing management on privately owned land (e.g. as highlighted by: Scherr, 1995; Noordwijk *et al.*, 2008; Ndayambaje *et al.*, 2012; Sabastian *et al.*, 2014; Byron, 2001). The development of tree-growing schemes inside state forests has added certain challenges, as discussed below, to those commonly faced by small-scale growers, and these need to be taken into consideration in future development.

As analysed in this thesis, the challenges in developing small-scale tree-growing inside state forests are particularly with regard to the inter-relation of different aspects of: (a) institutional arrangements, (b) social capital as the main endowment factor, (c) tenurial arrangements, (d) the roles of market incentives in stimulating tree-growing, and (e) the comparative advantages of small-scale tree-growing over industrial plantations. However, it is important firstly to synthesise the results from the analysis of the motivations and general driving factors for the schemes to be initiated and communities to be involved from the beginning, since these results provide the underlying explanations for further discussions.

Producing timber commercially has never been the primary objective of either of the two schemes reviewed. Both schemes were initiated mainly in response to the need to reinforce state property status in forest areas suffering from cases of intensive encroachment and intensive illegal logging. Specifically, the community tree-growing scheme was initiated mainly in response to repeated problems of open access to state forests due to those forests being under-managed by local and central governments. As found in the analysis, community tree-growing schemes in Sumbawa and Bima are part of the government's management strategy for rehabilitating state forests degraded by illegal logging and encroachment. It is also the case in other areas where smallholder tree planting is used as the alternative government-driven reforestation plan in the Philippines and Vietnam (e.g. as highlighted by: Byron, 1995; Pasicolan *et al.*, 1997; Bae, 2011; Wonodipuro, 2013).

Under the community-company partnership schemes developed inside state forests, company initiatives were mainly driven by the urgent need to resolve conflicts over land claimed by local communities and also by outsiders. However, there are good opportunities for the partnership scheme to be developed as one of the options for commercially viable small-scale tree-growing management inside state forests, if important challenges are addressed, as discussed in the later part of this section.

From the perspective of community members involved in community tree-growing schemes, the motivation to join the programme was mainly to obtain access to state forests to practise inter-cropping and the shared timber benefits under the scheme offered by the government. This is consistent with the experience of cases in Brazil, Panama, and in the Philippines, where the presence of external support as is the case in Sumbawa and Bima has been identified as one of the reasons for tree-growing to be adopted by the local community (Herbohn, 2002; Simmons *et al.*, 2002; Emtage, 2004).

Further, the alternative sources of income in both districts are lacking at the local level, as Scherr (1997) suggests is the case in Western Kenya.

Under partnership arrangements with a company, particularly, community members' motivation to join the scheme has been to utilise their unproductive land and to gain recognition of their rights to their claimed land inside state forests. This motivation is consistent with claims by Chambers and Leach (1987), Godoy (1992b) and Arnold (2001b), which state that tree-growing is part of a household management strategy to use trees as accumulated assets for household savings. Further, as highlighted by Pokorny *et al.* (2007), and as is commonly the case in the tropics, community partners are interested in the incentives offered by a company. As a comparison, for community members owning land outside state forests engaging in the partnership scheme and private tree-growing, their motivations have been mainly driven by the market incentives for obtaining economic benefits from timber planting (see further discussions in Section 5.3 and 5.4 for the partnership scheme, and Appendix 7-10 for private tree-growing).

With an understanding of the motivations and general driving factors for the schemes to be initiated and communities to be involved, the challenges are further discussed below.

(a) Policy and institutional arrangements under the state-nested system: the importance of policy framework at the national to partnership scheme and policy framework at district level to community tree-growing scheme

As discussed in detail in Chapters 4 and 5 and Section 6.2.2 of Chapter 6, both schemes are part of the collaborative arrangement under the state-nested system, in which the state is the *de facto* holder of all the legal rights (Carlsson and Berkes, 2005). Despite the fact that the rights for both schemes are granted by the MoF as representative of the central government, under the state-nested system of institutional arrangements one of the important factors in stimulating the tree-growing scheme to be effectively managed commercially is to have a more conducive policy framework (Torres-Lezama *et al.*; Gregersen *et al.*, 1992; Broadhead and Dubé, 2003; Resosudarmo and Colfer, 2003; Carlsson and Berkes, 2005; Cahyaningsih, 2008; Foundjem-Tita *et al.*, 2013). However, this framework cannot be designed without having a comprehensive understanding of the processes involved in the granting of relevant rights. Under the partnership scheme, rights to the community are granted by company as concession holder. On the other hand, rights granted to the local people in community tree-growing schemes are embedded in the *HKm-Hutan Kemasyarakatan* Scheme. These two approaches in granting rights have different implications for which policy and regulations can be effective on the ground in stimulating small-scale commercial tree-growing.

As the results in the thesis demonstrate, the policy framework at the national level is more important to partnership schemes than to community tree-growing schemes, particularly in providing secure access and flexible management opportunities. On the other hand, the implementation of the decentralisation policy and the regional autonomy under the authority of the district government has each provided some advantages for tree-growing development within community tree-growing schemes. The FDA (Forestry District Agency) has more flexibility in developing appropriate district-level policy and legislation frameworks tailored to local needs, conditions and problems to give a greater role in timber plantation management to the local community. Therefore, an overarching policy framework at district level is more important to the community tree-growing scheme, for example in resolving forest encroachment and illegal logging problems in the short term. However, these advantages could be more effective if the FDA had the strong and clear vision to accommodate the community' aspirations to be involved in state-forest management. Further, to be effective, a decentralisation policy should be in favour of devolution of full power from state to local community as the Mexican example *(Ejidos)* has shown (Antinori and Bray, 2005), which has been lacking in the case studies analysed. As in the case of the community tree-growing scheme, community rights are given inside forests, but the community does not have a significant degree of independence in managing the resources in terms of the property rights discussed in Section 6.2.3 in Chapter 6 (the comprehensiveness, duration, benefits conferred, transferability, and exclusiveness of forest tenure).

In the case of community-company partnership schemes, the existence or the absence of a district-level policy framework does not affect significantly the company's level of access into state forests, since it is the MoF that grants the company its concession areas for timber plantation development. Under the community-company partnership scheme, community involvement is embedded in the company rights granted by the state. Therefore, tree growers engaged in the partnership scheme have more advantages than those involved in the community tree-growing scheme. To some extent, community partners in the partnership scheme have more flexibility in being able to decide their investment alternatives, similarly to the case if the lands were privately owned, regardless of the community as a partner being bound by the contract agreement with the company. However, to ensure their sustainability in the long term, formal endorsement from the Ministry of Forestry is required for both schemes, as expressed in the ministerial regulation at the national level (discussed in Sections 4.2 and 4.3 in Chapter 4 and Section 5.2 in Chapter 5).

(b) Social capital as the main endowment factor: social capital is a key to generating other types of capital at the household level

The collaborative institutional arrangement between the FDA and the local community under community tree-growing schemes in Sumbawa and Bima has generated social capital leading to access inside state forests for community tree-growing. On the other hand, social capital generated from community-company partnership arrangements in Jambi and Sanggau has led beyond just the recognition of community rights, by opening access to direct benefits from timber plantation development inside concession areas.

In most cases, small-scale tree growers also deal with scarce forestry resources, in a similar way to other investments involving natural resources (Telser, 1988; Pearse, 1990; Armentano, 1992; Perman *et al.*, 1996). In the case of wood production strategies on privately owned land outside state forests, feasible tree-growing practices depend on the availability and the status of endowment at the household level, mainly land and other capital (i.e. human, natural, financial, social and physical) (Raintree, 1991; DFID, 1999).

As the analysis on the case study areas shows, developing small-scale commercial tree-growing inside state forests is mainly constrained by the effectiveness of the social capital as the primary endowment factor in generating other types of capital (see Section 6.2.2.2 in Chapter 6). The main advantages of having social capital at the beginning is actually justified; Cleaver (2005) confirms that rural community members with greater access to social capital have higher incomes, so it is important to enhance livelihoods. However, community members have to take advantage of the opportunity of having a strong external facilitation by third parties to deal with the main challenges, mainly from the facilitation processes by the government in the case of community tree-growing and by the company in the case of the partnership scheme.

(c) Tenurial arrangements: the long-term practicalities are determined by local communities' priorities in their livelihood strategies

As discussed in Chapter 4 (Sections 4.2 and 4.3) and Chapter 5 (Sections 5.2 and 5.3), despite the rights being granted inside the state forests, tenurial arrangements are fragile and receptive to external pressures, which has been proven historically. This has been also the case, for example, in the Philippines and Nepal (Cerin and Karlson, 2002; Adhikari *et al.*, 2004; Hlaing *et al.*, 2013). The long-term practicalities of these tenurial arrangements is closely determined by the livelihood strategies chosen by growers as part of their household income portfolio. For example, in the case of the community tree-growing scheme, land availability outside state forests to meet the need for food crops determines the level of commitment to continuing to manage land inside state forests. On the other hand, benefits from competitive land-use alternatives are important in determining community partners' long-term commitment. Taking into account this factor and some other challenges, the results have shown that the current tenurial arrangements are not adequate to ensure the commercial feasibility of the initiatives and the allocation of forestry resources to the most beneficial socioeconomic management. This is part of other external factors highlighted by Byron and Arnold (1999), Arnold (2001), and Angelsen and Wunder (2003) that include the increasing population pressure, encroachment by outsiders, and alienation of forests by the government, which are quite relevant and exist at various levels in the case-study areas.

As highlighted in Section 6.2.2 (Chapter 6), important lessons learnt include that there were significant estimated financial losses at both government and household levels as the costs of delaying community involvement in managing state forests under community tree-growing schemes in Sumbawa and Bima. On average, the estimated financial benefits losses per ha are Rp 133 million (AUD 15,752), corresponding to Rp 44. 4 billion (AUD 5.3 million) for the total area managed and assessed.

(d) The inter-relation between the market incentives and their effect in stimulating the trend for tree planting

It is generally perceived that the trend towards increasing timber prices and demand over the years, as reflected for example in the growing markets at local and national levels, is mainly due to the factor of local tree growers responding to market incentives. Driven by the strong incentives from the emerging new market opportunities, small-scale tree-planting management has increasingly become a more market-oriented strategy when the tenurial arrangement is secured (Arnold, 1997b; Dewees and Saxena, 1997b; Anyonge and Roshetko, 2003; Scherr *et al.*, 2004; Bliss and Kelly, 2008). Nevertheless, the remaining challenges to tree growers of limited access to markets and market information have not been completely resolved (see Section 4.4 in Chapter 4, Section 5.5 in Chapter 5, and Appendix 7-10).

However, with some limitations as discussed earlier in this section, tree growers involved in the two schemes cannot respond directly to incentives from the market under the state-nested system. Specifically, this is because no timber harvesting rights for commercial purposes are granted under the community tree-growing scheme. Under the partnership scheme, it is mainly the company who buys the timber (monopsony market system) and decides the price and royalty granted to tree growers, with no transparent information on how these were decided (as discussed in Section 5.5 of Chapter 5). Therefore, adjustment at least should be made by 10 times greater (based on the traditional rubber system) than the current royalty rate being applied as the basis for compensating timber bought from community, so revenues generated will become competitive compared to those from other land use options (i.e. for oil palm and/or rubber plantations).

(e) Comparative advantages over industrial plantations and the market niche for timber coming from small-scale timber growing

As discussed in Section 6.2.3.3, one of the main disadvantages of the state-nested system is that it tends to stimulate higher transaction costs, for example in comparison to private tree-growing. Even the overhead costs tend to be higher as well, particularly for the partnership scheme. This tendency is the opposite to the claim that small-scale tree-growing may operate at a lower cost structure, due to lower opportunity for labour and land compared to large-scale operations (Scherr, 1995; Scherr, 1997; Scherr, 2004). Although this may be true for the small-scale tree-growing practices developed on privately owned land with low competitive land use alternatives and population, it is not the case for tree-growing inside state forests in the case study areas.

In directing the strategy towards commercial tree-growing management, the priority for improvement should first be on the scheme with the least commercial objectives, which is the community tree-growing scheme, and then shift the focus to the partnership scheme. Well-designed short-term and long-term strategies are required in order for necessary and favourable socioeconomic and policy settings to be put in place. These will ultimately support the community in developing feasible and profitable small-scale timber plantations (see Section 6.3 of Chapter 6 and Chapter 7 for scenarios of production from small-scale commercial tree-growing).

Community tree-growing practices in Indonesia are in transition, as also highlighted by Dewees and Saxena (1997a) based on the case in Sudan, Kenya and India, Emtage (2004) for the case in the Philippines, and Robiglio *et al.* (2013) for the case in Cameroon, shifting toward more commercially oriented management and aiming for higher economic returns in response to various internal and external pressures, such as the increasing areas of degraded forest and land scarcity problems. External challenges are becoming very complicated as well, particularly under the globalised market. For example, there are cheaper substitutes from imported materials that have caused local timber coming from smallholders to be unable to compete in the local market.

All of these challenges discussed here from point (a) to (e) are important as the basis in designing the scenarios of recommendations for increasing the competitiveness of tree-growing as highlighted in Section 8.3. Furthermore, despite these challenges, there are opportunities for developing small-scale tree-growing using the appropriate strategy as further synthesised in Section 8.4.

8.2. What are the benefits and costs, in both social and economic terms, of the two existing schemes in comparison to other investment options using the same land?

As discussed in Section 4.4 (Chapter 4) and Section 6.2.3.4 (Chapter 6), alternative land uses as the main competitors of the community tree-growing scheme in case study areas are agricultural crops, for example turmeric, and NTFPs, such as candle nuts. On the other hand, as discussed in Section 5.5 (Chapter 5) and Section 6.2.3.4 (Chapter 6), for the partnership scheme, smallholder rubber and oil palm plantations are the principal competitors. Based on the analysis, the roles of competitive crops are different in community tree-growing schemes, in comparison to the competitive crops in the community-company partnership scheme.

Under the community-company partnership schemes studied, the average highest assumed costs per ha for developing acacia plantations, at Rp 28 million (AUD 3,379), are comparable to those for smallholder rubber plantation management, using both local and high-yield species. The costs per ha for acacia are much lower than for oil palm plantations, under both schemes (Rp 49 million or AUD 5,865 under partnership schemes, and Rp 36 million or AUD 4,284 for independent small-scale oil palm plantations). The highest benefits received per household are from rubber plantations using high-yield species at Rp 50 million (AUD 5,908), compared to oil palm plantations developed independently by smallholders at Rp 21 million (AUD 2,486) and to acacia plantations using company standard productivity at Rp 13 million (AUD 1,483).

Under the community tree-growing schemes studied, at the current management level, alternative investments—mainly a combination of cashew and candle nuts and turmeric and ginger—provide higher annual benefits per ha than tree growing, These, range from Rp 1.2 million (AUD 136) to Rp 5 million (AUD 563), compared to negative benefits at Rp 0.25 million (AUD 29) for the community tree-growing initiated by the central government, such as *HKm* in Sumbawa District, and compared to similar schemes initiated by local government, such as in Bima District, at Rp 1 million (AUD 139). These different net returns are despite there being no significant differences in costs per ha associated with the different options. At the household level, significant benefits could also be gained by restoring tree-growing to full standing stock under both types of management, with an average benefit of Rp 10 million (AUD 1,132–1,236). These benefits associated with fully stocked stands are higher than household benefits from the alternative investments at higher productivity.

Under the community tree-growing scheme, timber and the alternative crops are managed in the same area. What matters are the proportions of land allocated to these two crops, which should be at the optimum level required to generate incomes to support local livelihoods (Suwarno *et al.*, 2009), but should also follow the government regulation that defines the proportion of 70% to 30%, for timber and non-timber respectively. Under the community-company partnership scheme, alternative crops compete for the use of the same land resources, and the decision to shift from one alternative to the other is sensitive to market price signals. Therefore, if the company standard productivity can be achieved, the household benefits from acacia plantations are comparable with returns from these activities. Alternatively, households have to allocate more land to developing acacia plantations than the current areas.

By increasing productivity to the optimum level, small-scale tree-growing management under the two schemes will be able to compete with the alternative investment of competitor crops. Improving timber quality and productivity has long been an unresolved issue, mainly in developing countries (Current *et al.*, 1995; Antinori and Bray, 2005; Montambault and Alavapati, 2005; Noordwijk *et al.*, 2008; Roshetko *et al.*, 2008). As is the case elsewhere, the availability of high-quality planting materials at a reasonable cost at the tree-grower level, and the delivery of technical interventions by the forestry agencies to address problems in providing appropriate extension services, have been identified as the specific problems hampering efforts to increase productivity (Harrison and Herbohn, 2001; Anyonge and Roshetko, 2003; Noordwijk *et al.*, 2008; Roshetko *et al.*, 2008; Bertomeu, 2012). For the partnership scheme, improvement in productivity can be achieved with the assistance of the company, which usually has a good research and development unit and well-trained field staff. Under the partnership scheme, the company often takes over from the local government the role of providing forestry extension services (Nawir *et al.*, 2003b).

8.3. How does this analysis suggest policies and schemes to promote small-scale commercial tree-growing in Indonesia should be designed?

As discussed in Section 6.3 in Chapter 6, frameworks for increasing the competitiveness of the community tree-growing scheme are developed with the objective of facilitating small-scale wood production to meet the national demand; community-based forest management in state forests remains an important component of this strategy. The government is interested to enhance the strategy for commercial timber production by developing better policies and legislation that can improve smallholder access to the market and deliver more equitable benefits.

Arrangements of direct and indirect (enabling) incentives for more successful community tree-growing schemes should focus on three main categories of action: (1) improvements to the overarching institutional and policy framework for feasible and competitive tree-growing, including tenurial arrangements that are founded on the principles of economic importance of property rights; (2) the essential aspects required to support robust and competitive enterprises at the management level; and (3) the required improvement in incentives to ensure secure and fair timber market development and for tree growers to have secure and fair access to the market. On the other hand, the improved arrangements required for the community-company partnership scheme have two main components: first, a conducive overarching institutional and policy framework to support companies' initiatives, and second, robust and competitive tree-growing management under partnership arrangements.

However, the improvement scenarios for both schemes include at least five risks that have to be taken into account. The first is the differing priority agendas and conflicting polices and legislation produced by the different ministries responsible for managing forest and non-forest lands allocated to forest production and estate and agricultural crops. The second risk is that there are different development and economic priorities at district, provincial and national levels. The third relates to the changing priorities of tree growers in allocated lands, which are driven by household needs and market signals relating to food crops and/or options with higher benefits. The fourth risk relates to the shifting priorities among the wood-processing industries, for example due to the availability of cheaper substitutes from imported materials due to the globalised market, as mentioned in Section 8.1. Lastly, there is also the risk of uncertainties from external factors, such as timber prices, economic crises, and the national political condition, as the analysis discussed in Chapter 5 has confirmed.

8.4. How does this information and analysis inform the potential contribution of timber from small-scale commercial tree-growing to the wood production strategies in Indonesia?

As discussed in Section 7.1 (Chapter 7), the analyses suggest a considerable gap between supply and demand for the two major wood products in Indonesia, namely pulp-based and round wood timber. Timber supply in Indonesia for more than three decades has been coming from logging conducted by concession holders (*HPHs)* and land clearing, usually from timber cutting inside concession areas for industrial timber plantations (*HTIs*), and timber produced in plantations by *HTIs* (Nurrochmat, 2000; Indonesian Working Group on Forest Finance, 2010). As discussed in Section 7.2.1 (Chapter 7), there has been a decreasing trend in timber supplied from these sources for different reasons, such as the slow growth of timber production by *HTIs*. It is expected that the development of small-scale tree-growing could contribute considerably. However, community-based plantation initiated under the *HTR* since 2006 has faced many challenges, such as unclear tenurial arrangements and complicated legal and loan disbursement arrangements (Nawir and ComForLink, 2007; Noordwijk *et al.*, 2007; Schneck, 2009; Obidzinski and Dermawan, 2010).

In this thesis, it is proposed that the key strategic direction in stimulating small-scale commercial tree-growing should be targeted to match the demand for specific timber from different wood-based processing industries as the direct consumers. Timber demand refers to a derived demand from finished timber products used by the end-users. In particular, the development of small-scale commercial tree-growing can be focussed on degraded forest areas inside state forests and privately owned land outside state forest. There is degraded land totalling 79.97 million ha. Degraded areas inside state forests can potentially be developed for small-scale tree-growing through various schemes: the *HKm* or community-company partnerships or the *HTR*. In addition, there is a potential area for plantation development on privately owned land totalling 9.43 million ha.

Even though productivity per unit area from small-scale tree-growing is currently low, strategic efforts to achieve this target should be developed by taking into consideration the important factors for feasible and commercially competitive small-scale tree-growing, as discussed in Section 6.3 of Chapter 6. Further, as discussed in Chapter 2, the application of the scenarios should take into account the uncertainties inherent in the characteristics of forestry investment, the conditions of imperfect market competition, and the specific characteristics of timber markets for pulp-based and round wood timber. The pulpwood market has the characteristics of a monopsony market, but that for round wood timber is more competitive and based on dynamic interactions between producers and consumers. However, the middle-men or brokers have a strong role that is often overly regulated, as discussed in Chapter 4 and Appendix 7-10, in relation to the case of wood produced from private tree-growing plantations.

Assuming the conditions for the improved arrangements described above can be met, small-scale tree-growing can potentially fill the gap in wood supply in Indonesia. Scenarios for timber production from small-scale tree-growing were developed based on the characteristics of wood-based processing industries, which are grouped into two broad types of products from the pulp-based and round wood-based industries. The round wood-based industries are further divided into: (1) those which are using a high commercial value timber, such as teak, and (2) those which are using a lesser commercial value timber, such as paraserianthes or pine.

Based on the key locations of pulp-based processing mills, the development of timber plantations by using fast-growing species, such as acacia and/or eucalyptus, inside state forests on degraded forest areas should be given priority in Jambi, North Sumatra, Riau and South Sumatra, with a total area of 15.82 million ha. In Kalimantan, the allocation of degraded forest areas for planting fast-growing species should be concentrated in East, South and West Kalimantan, with a potential area of 6.05 million ha. In addition, there are another 5.26 million ha in Sumatra and 164 thousand ha in Kalimantan on privately owned lands outside state forests that can be allocated to timber plantation for wood chips used for pulp production. However, there should be a guaranteed market in Sumatra considering that the industry buyers can cover the production costs, such as buying the seedlings, and transportation costs to the processing mills in Sumatra. More prominent intervention from central and local governments to provide the appropriate incentives and to link the interested growers and companies should be given priority.

Round wood-based industries are scattered in different provinces on a number of islands, and most of the processing industries producing sawn wood are concentrated in Java, Sumatra and Kalimantan. Taking into account the distribution of existing wood-processing industries, the development of round wood production with timber of lower commercial value should be focussed in Java, Sumatra, Kalimantan, Sulawesi, Maluku and Papua. In Java, this should be in West Java, where most of the processing industries using this type of timber are located. Expansion for the planting of high commercial value timber should be focussed in Java, Sulawesi, Bali and Nusa Tenggara, where the comparative advantages are clear, mainly from having industries that specialise in handicraft and furniture and/or having the advanced experience of local growers in developing teak plantations.

The different schemes of small-scale commercial tree-growing on degraded land inside state forests can potentially contribute to the national wood supply to meet industry requirements for wood. A total of 21.9 million ha inside state forests could produce 547 million m^3 per year, or about 31 times the total annual wood requirement of all pulp and paper mills. Private tree-growing could supply eight times the wood requirement of the various wood industries. For the high-value round wood production from teak, small-scale commercial tree-growing inside state forests on degraded land can contribute up to five times the wood required, complemented by 2–3 million m^3 per year from wood from privately owned land outside state forests. Production from low commercial value round wood can contribute up to 19 times the wood requirement and be complemented by double the wood production from new, privately owned lands. A total estimated wood production of 1,458 million m^3 (inside state forests) could contribute 50 times the wood required. This would be complemented by six times the additional supply from wood produced from privately owned land under the private tree-growing scheme.

Using the estimated timber income received from different wood production sources in different regions, the total estimated generated income for all forestry households involved reached Rp 33.17 trillion (AUD 3,934 million) at optimal scenario with an optimal productivity per ha. At lower levels and numbers of forestry households, productivity per ha reached Rp 8.29 trillion (AUD 983 million). At the optimal level, the total estimated benefit received by households is about one-tenth of the total actual MoF revenues from taxes and grants from donors in 2009, which was Rp 396.21 trillion (AUD 46.99 million) (MoF, 2009c). The comparisons have shown that the impacts of timber production at the national level could play a significant role in improving local livelihoods. In addition, there are multiplier effects that can potentially be generated, such as job opportunities in wood-based processing industries, as well as business opportunities along the market chains at local and national levels.

8.5. Final conclusions and recommendations for future research

The scarcity of forest and land resources, and at the same time the perceived low benefits from small-scale timber growing, have served as incentives to convert forest areas to other investment alternatives. At the current stage, access to state forest land and opportunities for the local community to derive benefits from the plantations have increased under the two schemes of community tree-growing and community-company partnership, but there are still many challenges for them to become feasible and commercially competitive, as well as to significantly enhance the livelihoods of the local people. Overall, despite these various challenges to improving the development of timber plantations by local communities inside state forests, there are promising opportunities, and the results discussed in this thesis contribute to realising these opportunities. The failure of supply to meet demand has caused an increase in timber prices at the national level. This would suggest that there is room for further development in timber production, both inside and outside state forests. There are important lessons from this study to improve other small-scale tree-growing strategies, such as the *HTR*, considering that the three models under the *HTR* Scheme are closely associated with the community tree-growing or community-company partnership schemes. As the results reported here demonstrate, the different schemes of small-scale commercial tree-growing on degraded land inside state forests can potentially contribute to the national wood supply to meet industry requirements for wood.

Future research with a focus on practical implications can be directed at two main issues. Firstly, recognising the main impediments due to policy and regulatory frameworks, a thorough and comprehensive review processes should be conducted at national, provincial and district levels to review, align and streamline relevant policies and regulations; and, as a result, the government can give priority to improving the relevant policies and regulations in order to provide better support for strategies to implement small-scale commercial tree-growing schemes on the ground. In this context, full economic CBA should be conducted in order to gain a comprehensive understanding of social and ecological costs and benefits. Secondly, conducting a comprehensive study to systematically identify and map wood-based industries across

Indonesia, particularly the small-scale industries that are poorly characterised, would be an important next step in linking established smallholder resources to markets. This is important as the basis for strategically directing the expansion of small-scale tree-growing in Indonesia to be aligned with markets for this wood.

Appendices

Appendix 1-1. Glossary and Terms

Afforestation	Rehabilitation initiative usually implemented on community land outside state forest (according to the MoF definition).
Agricultural extensification	Development of an extensive form of agriculture to some extended areas with or without applied/use of cultivation technologies and modern tools.
Agricultural intensification	Development of intensive forms of agriculture that could be attributed to major technical inventions (e.g. metal tools, terracing, the plough, oxen teams) or to increase knowledge (e.g. fertilising, breeding of draft animals or more productive forms of crops).
Agroforestry system	A land management system that combines agriculture and a forestry component to create more integrated, diverse, productive, profitable, healthy and sustainable land-use systems (King and Chandler, 1978).
Authoritative	Given with or showing authority.
Agroforestry System	A land-use system consisting of a number of components: trees, tree crops, seasonal plants and or grass, where the physiognomy and the function are almost similar to the natural ecosystem (Michon and de Foresta, 1992)
APL (Areal Penggunaan Lain)	Forested/non-forested areas outside state forest that are allowed to be converted to other purposes.
Awig-awig	Refers to traditional rules on local land management in Sumbawa and Bima Districts of West Nusa Tenggara created, agreed and respected by all members (see Box 4-3 in Chapter 4).
Consumer surplus	The value that consumers would be willing to pay for extra price differences above the market price (Pearse, 1990; Klemperer, 1996).
Common pool resources	Refers to resources that are available for use by all, whether in an unregulated ('open access') or a regulated way, and may be owned by national, regional, or local governments, by communal groups, by private individuals or corporations (Arnold, 1998; Ostrom, 2000; Meinzen-Dick *et al.*, 2006).
Common property (or communal property)	Common property describes the rights to a resource held by a group of identifiable users who apply certain access rules to the members and exclusion rules to non-members (Burger and Gochfeld, 1998; Ostrom, 2000).
Conflict resolution mechanism	The process used in attempting to resolve a dispute or conflict.
Cooperative	Farmer groups that also function as tree-grower organisations (formal, registered to Ministry of Cooperative) Cooperative.
Cost Benefit Analysis	One approach used to assess the feasibility, whereby the Net Present Value (NPV) of returns per hectare from a project or initiative is calculated. The decision criterion used in the financial analysis is to consider a project feasible if its NPV is positive.
Competitive commercially (or commercially competitive)	Able to compete with other investment alternatives managed for commercial purposes.

Community-company partnership scheme (*Kemitraan*)	This partnership is defined as two or more parties jointly managing land, capital, and market opportunities with the main objective of producing a commercial forest crop or timber in a plantation forest based on a contractual agreement (Race, 1999; Mayers, 2000; Mayers and Vermeulen, 2002).
Community tree-growing scheme	Right embedded under the *HKm* scheme, in which a community as a group can be granted the usufruct rights to manage a certain allocated area following an approved proposal submitted by the community as a group to the Minister of Forestry (MoF, 2009d).
Critical land	Degraded land that must be reforested (Kartodihardjo and Supriono 2000).
Decentralisation	The expansion of local autonomy through the transfer of power and responsibilities away from a national political and administrative body (Charter, 2001).
De facto property rights	Property rights based on a claim from a certain party, such as a local community, and often not supported legally under government law.
Deforestation	The loss or continual degradation of forest habitat due to either natural or human-related causes. Agriculture, urban sprawl, unsustainable forestry practices, mining and petroleum exploration all contribute to deforestation.
Degraded forest land/degraded land	Formerly forested lands severely impacted by intensive and/or repeated disturbances, e.g. fires or illegal logging. The degraded forest land delivers a reduced supply of goods and services from a given site.
De jure property rights	Property rights that are supported legally under a certain government law.
Demand	the demand curve for a good (or service) reflects quantities consumed of that good (or service) at different prices by a given consumer group for a certain period of time (Pearse, 1990; Klemperer, 1996).
Derived demand for timber	Demand for timber derived from various wood-based final products, such as newspaper or furniture
Ex-logging area	A forest area where logging activities had formerly been conducted.
Farm forestry	Forest developed outside state forest areas.
Feasible (socio-economically feasible)	In this thesis, feasibility is determined from financial and social perspectives.
Financial feasibility	Determines based on decision rules in financial Cost and Benefit Analysis (CBA), which include: NPV, IRR, NBIR, EAE, and LEV (see Section 3.3.3 in Chapter 3). These are complemented by qualitative analysis of social aspects, such as cultural values.
Forest encroachment	Illegal forest activities (e.g. agriculture practices), usually in a state forest area, that have affected the forest ecosystem.
Reforestation or forest rehabilitation initiatives (definition used in this report)	Deliberate activities aimed at artificial and/or natural regeneration of trees on formerly forested grasslands, brushlands, scrublands, or barren areas for the purpose of enhancing productivity, livelihood, and/or environmental service benefits (CIFOR Rehab Team, 2003)
Forestry Services (Provincial Forestry Services/Forestry District Services)	Agencies at provincial and district levels under the Ministry of Forestry. They are responsible for the implementation of forestry policies and control of the forest areas inside their jurisdiction.

Forest rent and royalties	Charges or payments applied to forestry production, e.g. timber. Ideally payments should reflect the real economic values of forestry resources in encouraging the behaviour to protect the resources.
GN RHL/Gerhan	The National Movement for Forest and Land Rehabilitation, initiated in 2003.
HTHR-Hutan Tanaman Hasil Reboisasi	Timber plantation resulting from the rehabilitation programme.
Hutan Tanaman Industri (HTI) or *Hak Pengusahaan Hutan Tanaman Industri* (HPHTI)	Permission to establish an industrial plantation forest in a designated area and to supply the raw material for the processing industry. For this purpose, fast-growing species are commonly planted.
HTR (Hutan Tanaman Rakyat)	Community-based plantation forest programme, initiated in 2006 by the Ministry of Forestry, targeting community groups and individuals to be granted rights to develop plantation forests inside state forest (Director General of Forestry Production Management, 2006).
HTI swakelola (self-managed *HTI*)	Self-managed timber plantation development that usually is managed by local community group (cooperative) based on the rights granted by the local government, which also provides the funding.
HTI Trans or Hutan Tanaman Industri Transmigrasi	Joint industrial plantation forest between Concession Holders and the participants in the transmigration program (reallocation program of people from Java to outer islands).
Illegal logging	The illegal removal of timber/logs from a forest, and this illegal activity affecting the forest (e.g. ecosystem) and the people who depend on it (Tacconi *et al.*, 2004).
Incentive package	A package of incentives created by company to attract prospection partners to join the community-company partnership scheme (see Sections 5.3 and 5.4 in Chapter 5).
Institution	Social structures and mechanisms of social order and cooperation governing the behaviour of two or more individuals.
Integrated approach	Approaches taking into account various aspects of ecology, economics and sociology from inter-related points-of-view.
Imperfectly competitive market structure	Market structure that fails to meet the conditions for a perfectly competitive market include: free entry of firms and consumers; firms and consumers maximising their profits; output price defined by purely market mechanism resulting from supply and demand of a certain product or services being traded in the market; free mobility of labour and capital; and inputs priced at market value (Pearse, 1990; Klemperer, 1996).
Kabupaten	District (part of a province) and consisted of sub-districts
Kecamatan	Sub-district (part of a district), and consisted of villages.
Kelompok tani (tree-grower group)	In this thesis, it is defined as farmer groups that also function as tree-grower organisations (informal) (Nawir *et al.* 2003).
Kelompok Usaha Bersama	Community development group-a tree grower group under a Participatory Reforestation scheme.

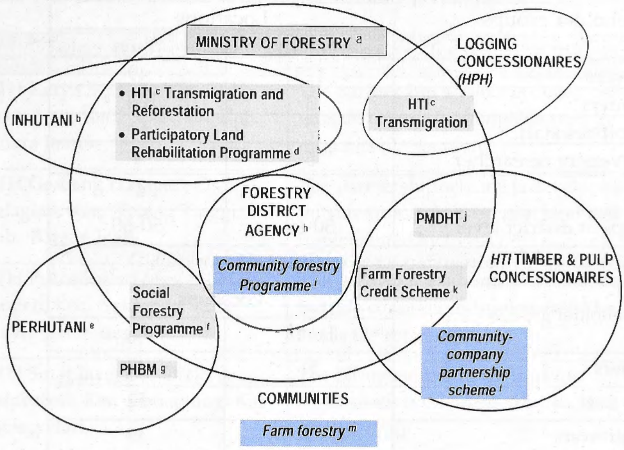
Kredit Hutan Rakyat (Farm Forestry Credit Scheme)	Farm Forestry Credit Scheme, or *Kredit Hutan Rakyat*, was mainly provided from Reforestation Funds and ended in 1998. It was provided to the community through a competent business partner, such as a timber plantation company.
Land degradation	A human-induced or natural process that negatively affects the capacity of land to function effectively within an ecosystem by accepting, storing and recycling water, energy and nutrients.
Land tenure	The right to exclusively occupy and use a specified area of land and forest.
Livelihood	Capabilities, assets and activities required for a means of living (DFID 1999)
Logged-over area	A forest area where logging activities have been conducted.
Market failure	A situation in which markets do not efficiently organise production or allocate goods and services to consumers. Market failure reflects a situation in which a free market mechanism is prevented from achieving optimum welfare conditions (Klemperer, 1996).
Matching funds (*Dana pendamping)*	10% of funds that should be provided by local government (usually at district level) in complementing the budget allocated by central government to implement the rehabilitation programme under *DAK DR*.
Monopoly	A single firm in a market producing all outputs of one product or service (Klemperer, 1996).
Monopsony	The mirror image of monopoly: reflects market failure cases when only one firm/consumer buys the product that is being sold by the producer/seller (Perkins, 1994).
Non Timber Forest Products	All products collected/harvested from forest areas except timber or wood, such as rattan, fruits, honey, etc.
Out-grower scheme	See community-company partnership scheme.
Oligopoly	Common cases in many product markets, where a few producers supply all output of one product or service in a market (Klemperer, 1996). In oligopoly, the number of buyers/consumers can be few or unlimited (Pearse, 1990; Klemperer, 1996).
Oligopsony	Market condition in which there are limited numbers of buyers (Pearse, 1990; Klemperer, 1996).
Open access	The term used to describe the condition of the absence of any well-defined property rights, as a consequence of which the resources are free to everyone and no one has the legal right to exclude anyone from using the resource (Ciriacy-Wantrup and Bishop, 1975; Berkes *et al.*, 1989; FAO, 2002).
Overhead costs	In this thesis these include direct and indirect overhead costs: direct overhead costs are included as part of harvesting and transportation costs and timber taxes related to *PSDH (Provisi Sumber Daya Hutan)*; and indirect overhead costs include funds for negotiation processes, conflict resolution and forest protection.

Participation	Active involvement of insiders and outsiders in all decisions related to objectives and activities, as well as the activities themselves. The primary purpose of participation is to encourage community self-determination and thus foster sustainable development (Case, 1990; Nawir *et al.*, 2003b).
Participatory approach	An approach to development that accommodates the involvement of interested stakeholders, e.g. the community.
Partnership	The range of relationships established by two or more parties in the expectation of benefits. A partnership may be formal or informal and may involve third parties in a variety of roles (Case 1990).
Perfectly competitive market	There are a large number of sellers of a similar product; therefore each seller is insignificant to the total market supply and, left alone, the product's market price is determined by market mechanisms (Pearse, 1990; Klemperer, 1996). In most market systems, the two important components are demand and supply (Pearse, 1990; Klemperer, 1996).
Perhutani	A state company whose main responsibility is to manage teak plantations on Java (Nawir *et al.* 2003).
Pesanggem	Community members who were provided with opportunities to practise inter-cropping in state forests managed by Perhutani, and in return communities devoted themselves to maintaining and supervising the main timber crops.
Poverty	The condition of being without adequate food, money, shelter, health care, etc.
Producer surplus	The economic rents (net economic gains) of the producer, which is usually an individual or a community group with a secure access to the land (Pearse, 1990; Klemperer, 1996).
Private property rights	Refers to individual or corporation-owned property with full exclusive rights to manage, sell or rent, as well as to exclude others from having any access to the property (Berkes *et al.*, 1989; Burger and Gochfeld, 1998).
Privatisation	The transfer of property or responsibility from the public sector (government) to the private sector (business).
Productivity	The amount of output created (in terms of goods produced or services rendered) per unit input used.
Profitability	The ability to earn a profit.
Profitable management	Management that can earn profits.
Reforestation	A forest rehabilitation initiative implemented inside a state forest area (according to the MoF definition). See also Afforestation.
Reforestation Funds	Government revenues from timber concession companies that aim to finance the rehabilitation of degraded forests (Nawir *et al.* 2003).
Relative advantage	The comparison between the advantages and disadvantages of factors influencing the management of a scheme, and/or of factors affecting one scheme in comparison to another one.
Reinvestment mechanism	A mechanism to ensure that there is funding continuity from the current operation, e.g. by allocating a certain proportion of the revenues to fund follow-up activities.

Resource-based management	The management of natural resources that places emphasis on balancing socio-economic and environmental factors.
Secondary forest	A forest or woodland area that has regrown/regenerated after being deforested. Secondary forest tends to have trees that are closer together than they are in plantation forests. Secondary forest also tends to contain more undergrowth.
Shifting cultivation	An agricultural system in which a person uses any piece of land involves a few years of farming followed by several (more) years of fallow. This system often involves clearing a piece of land in the beginning. Once the land becomes inadequate for crop production, it is left to return to its natural vegetative state.
Slash and burn	A specific functional element of certain farming practices, often shifting cultivation systems.
Social Forestry	An approach that tries to change the (negative) attitude of people towards forests, in order to change their behaviour.
Social Welfare	A range of government programmes that provide assistance, to those in need, to enable them to maintain a minimum standard of well-being.
State forests	The state is the holder of all the legal rights (Carlsson and Berkes, 2005).
State-nested system	Formal collaborative management inside state forests, in which the state is the *de facto* holder of all the legal rights (Carlsson and Berkes, 2005).
Supply	The supply curve illustrates how much of a good (or service) would tend to be supplied at different prices, or in other words, the supply curve shows the marginal cost in producing a good (or service) at various prices (Pearse, 1990; Klemperer, 1996).
Surat Keterangan Tanah (SKT)	A land status certificate signed by the Head of a Village (Nawir *et al.* 2003).
Survival rate	Comparison between planted seedlings that have survived and the total number of seedling that were planted. This is usually stated as a percentage (%) (Nawir *et al.*, 2007f).
Sustainable development	The ability of the present generation to meet its needs without undermining the ability of future generations to meet their needs (Charter, 2001)
Sustainable Forest Management	A set of practices that are undertaken within the legal and regulatory framework and that pursue a variety of goals, including the sustained yield of forest goods and services, positive socio-economic impacts, and maintenance of biodiversity (Tacconi *et al.* 2004).
Taungya system	A man-made forest establishment which allows landless/forest-dependent people living inside or around of forest areas to grow food crops and fuel wood in between rows of timber trees during the first two to three years of tree plantation.
Timber management	Forest management that places emphasis on timber production objectives.
Top-down approach	A political development approach that omits participatory processes.

Transaction costs	In this thesis, transaction costs refer to the additional costs when compared to the business-as-usual development of timber plantations with no partnership under the *HTI* scheme, such as for setting-up the institutional arrangements and the contractual agreement.
Transmigration	A government policy to move people from Java and Bali to the outer islands, implemented since the 1960s. However, it began with the Dutch 'kolonisatie', then continued after Independence.
Village-owned enterprises	Business units managed by the village government, which aim to make a profit.

Appendix 1-2. Diagram of programmes to involve community in national forestry plantation development since 1970s



a. Programmes since 1970s under the control of Directorate General of Social Forestry and Land Rehabilitation, and/or Directorate of Forestry Plantation Development within the Directorate General of Forest Production Development Program

b. Inhutani is a state company with the responsibility to manage production forests in outer islands and to rehabilitate logged-over forests

c. HTI-*Hutan Tanaman Industri* is a timber plantation concession granted by the Ministry of Forestry to the companies

d. Participatory land rehabilitation program was never completely developed after the initiation in 2000

e. Perhutani is a state company with the main responsibility of managing teak plantations on Java

f. The social forestry program during the 1970s and 1980s mainly focussed on providing opportunities for local people to practise Taungya inside teak plantations (*Pesanggem* system)

g. Managing the forest with the community, or PHBM-*Pengelolaan Hutan Bersama Masyarakat*, was initiated (early 2000) by Perhutani focuses on providing revenue-sharing from harvested teaks

h. Forestry District Agency (FDA) has the responsibility for the implementation at district level

i. Community Forestry Programme was replaced with Social Forestry Programme in 2002 before being reinstated in 2007 up to the present

j. Social Forestry Program called PMDHT-*Pembinaan Masyarakat Desa Hutan Terpadu* (Integrated community forestry development)

k. Farm Forestry Credit Scheme or *Kredit Hutan Rakyat* was mainly provided from Reforestation Funds and stopped in 1998. It was provided to the community with a competent business partner, such as a timber plantation company

l. Community-company partnership schemes (used to be called 'Integrated HTI system)have increasingly become a common practice in timber plantation development in Indonesia (Potter and Lee, 1998; Nawir *et al.*, 2003b)

m. Farm forestry refers to private tree growing as the term used in this thesis.

Sources: Adopted from Nawir *et al.* (2003)

Appendix 3-1. Sample numbers by stakeholders

A. Community tree-growing schemes		
Stakeholder groups	Locations	
	Sumbawa	Bima
1. Tree growers	127	49
2. Wood traders	3	n.a. [a]
3. Forestry offices staff	7	6 [b]
4. Local university researcher	5	4
5. NGOs	4	4 [b]
6. Workshops at district level	50-60	50-60
B1. Community-company partnership schemes (first field work: 2001)		
Stakeholder groups	Locations	
	Jambi	Sanggau
1. Tree growers	51	43
2. Company staff	9	12
3. Non-tree growers	9	19
4. Government officers	9	5
B2. Community-company partnership schemes (second fieldwork: December 2008-January 2009)		
Stakeholder groups	Locations	
	Jambi	Sanggau
1. Tree growers	41	54
2. Contract workers	3	7
3. Head of cooperatives/villages/sub-	4	3
4. Company staff	5	8 [b]
5. Wood traders	4	8
6. Forestry offices staff	4	4
7. Local university researcher	3	n.a.
8. NGOs	2 organisations (5 persons)	2 organisations

Notes:

a. Traders: n.a.; however, there was good documentation based on a study that was conducted by WWF and Mataram University on local timber marketing(see WWF Indonesia Program Nusa Tenggara, 2007b)

b. Followed-up by emails and phone calls for further discussion and clarification

Appendix 3-2. Selected sites for community-company partnership schemes

Appendix 3-2. 1. Selected sites in BatangHari/Muara Jambi, Jambi

Selected sites [a]	Reasons for selecting the site
1. KTH Karya Bersama, Ds. Suko Awin Jaya, Kec. Sekernan, Kab. Muara Jambi	The partnership scheme is developed outside concessions implemented by migrants (2ndrotation)
2. KTH Gerbang Harapan, Ds. Kelagian, Kec. Tebing Tinggi, Kab. Batang Hari	The partnership scheme is developed outside concessions on peat land and implemented by locals (2ndrotation)
3. KTH Putra Hutan Mas, Ds Sengeti, Kec. Sekernan, Kab. Muara Jambi	The partnership scheme is developed outside concessions implemented by locals (2ndrotation)
4. KTH Sinar Jaya, Ds. Olak Rambahan, Kec. Pemayung, Kab. Batang Hari	The partnership scheme is inside concessions implemented by locals (2ndrotation)
5. KT Beringin Jaya, Ds. Lubuk Ruso, Kec. Pemayung, Kab. Batang Hari	Representing the partnership scheme outside concessions implemented by locals; they do not want to continue the partnership for 2nd rotation.

Notes: a. KTH-*Koperasi Tani Hutan*/KT-*Kelompok Tani*: Tree grower cooperatives

Appendix 3-2. 2. Selected sites in Sanggau, Jambi

Selected sites	Reasons for selecting the site
1. Mengkiang	The partnership implemented by locals (*i.e. Melayu)* (2nd rotation)
2. Tokang Sekayam	The partnership implemented by locals (*i.e. Dayak)* (2nd rotation)
3. Layak Omang	The partnership implemented by locals that is just newly implemented in 2008 (*i.e. Dayak)*
4. Beringin Maju	The partnership implemented by migrants (2nd rotation)

Appendix 4-1. State-owned company, Perhutani, and its assignment to rehabilitate degraded state forests in West and East Nusa Tenggara

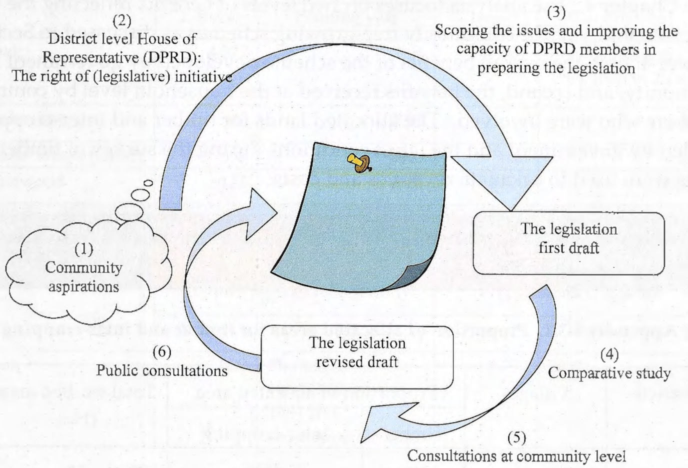
Perhutani is a State-Owned Enterprise *(BUMN-Badan Usaha Milik Negara)* in the form of a Public Corporation *(Perum-Perusahaan Umum)*. Perhutani's main responsibility is managing state forests in the islands of Java and Madura, while the other state-owned companies (Inhutani 1 to V) have the obligation to manage and rehabilitate logged-over state forest areas in the outer islands, Sumatra, Kalimantan and Sulawesi.

However, despite its main responsibility to manage state forests in Java and Madura, Perhutani was assigned in 1986 by the MoF to rehabilitate degraded state forests in two provinces of West Nusa Tenggara and East Nusa Tenggara of Eastern Indonesia based on Ministerial Forestry Decree No. 337/Kpts-II/1986 dated January 11, 1986. The area of state forests to be managed was 45,000 ha in East Nusa Tenggara. In West Nusa Tenggara, total areas were 26,937.64 ha (Sumbawa District: 18,307.64, Dompu District: 4,446 ha and Bima District: 4,184 ha). Reforestation was implemented under the framework of HTI's development concept with minor involvement of the local community.

The rehabilitation programme based on HTI's development framework was changed in 1994 to the Community Forestry Scheme *(HKm)* following the instruction based on Ministerial Forestry Decree No 1031/Menhut-V/1994 (date July 15, 1994). The implementation of this programme was based on a letter of decree from the Directorate General of *Reboisasi dan Rehabilitasi Lahan* (Land Rehabilitation and Reforestation) No. DG RRL. 383/V-PPS/1994 on 10 September 1994. Under the *HKm*, the proportion of timber and non-timber crops inside state forests must be 70% timber to 30% non-timber crops. Perhutani finished its assignment in 1998, based on the Ministry of Forestry and Estate crops decree No. 2013/IV/Ps-i/2000 dated 1 August which instructed that planting activities should cease.

Sources: Supardi *et al.* (2006), MoF (2007b; Undated), Nawir *et al.* (2007d), and Perhutani (2010)

Appendix 4-2. Participatory processes in producing *Perda PSDHBM: Peraturan Daerah Pengelolaan Sumber Daya Hutan Bersama Masyarakat* (District regulation on collaborative forest resource management with the community)



File: Rev Diagram proses Perda PSDHBM Sumbawa.doc

Processes:

1. **Community aspirations:** formal requests from community to convert existing forest plantations to new farming areas received by the *DPRD-Dewan Perwakilan Rakyat Daerah* (District level House of Representatives).
2. **The right of (legislative) initiative of the District level House of Representatives (*DPRD-Dewan Perwakilan Rakyat Daerah*):** The *DPRD* took the initiative and produced legislation at the district level to serve as the policy framework for implementing collaborative forest resource management with the community.
3. **Scoping the issues and improving the capacity of *DPRD* members in preparing the legislation:** to explore the issues, and also to enhance their knowledge by conducting a series of workshops and focus group discussions involving various experts and stakeholders, as well as learning from past experiences of other district governments. Stakeholders consulted included academics and NGOs.
4. **Comparative study:** learn more from other districts that had produced similar legislation, specifically Wonosobo District, Central Java, which had formalised the *Perda PSDHBM* in 2001.
5. **Consultations at community level:** The first draft of the legislation was discussed with a range of community groups, with the main aim of exploring communities' perceptions about the draft and also to identify any potential conflicts with local customary norms and laws.
6. **Public consultations:** firstly, aimed to explore and document other related regulations to prevent possibility of duplication; and secondly, aimed to seek and incorporate inputs from the general public

Sources: Adapted from Jabir and Julmansyah(2003); Sabani *et al.* (2003); and Adi *et al.* (2004).

Appendix 4-3. The basis for CBA analysis for community tree-growing schemes in Sumbawa and Bima

The CBA focuses on two main components, timber and crops used for inter-cropping, and took into account historical management changes as discussed in Sections 4.2 and 4.3 in Chapter 4. The analysis focuses on two levels of benefits reflecting the feasibility and profitability of the community tree-growing schemes as discussed in Section 4.4 of Chapter 4: first, the overall benefits of the scheme developed by government involving community; and second, the benefits received at the household level by community members who were involved. The allocated lands for timber and inter-cropping decided by government and the latest conditions during the survey of timber standing stocks were used to calculate revenues and costs.

A. Land allocation for timber and inter-cropping as the basis to calculate revenues and costs

Table Appendix 4-3.1. Proportion of allocated areas for timber and inter-cropping

Districts	Villages	Proportion of allocated area		Total studied area (Ha)
		Timber	Inter-cropping	
Sumbawa	Semamung	32%	68%	51
	Lamenta	90%	10%	509
Bima	Ntori	40%	60%	7
	Nggelu	34%	66%	20

B. Timber

B1. REVENUE COMPONENTS

B1a. Revenues were calculated based on thinning and harvesting of existing standing stocks in a given year (ages) and on when the collaboration was initiated, as shown in the table below. Thinning activities were based on silviculture standard guidelines that would be imposed by Perhutani (see B1d in this section on thinning).

Appendix Table 4-3.2. Types, number of trees and planting year in Sumbawa and Bima

A. Case study site in Sumbawa [a]				
Types of trees	Schemes (Villages)			
	Perda PSDHBM (Semamung)		NSF Programme (Lamenta)	
	Σ trees	Planting year	Σ trees [b]	Planting year
Teak	3,322	1996	47,081	First planting in 1994, then in 2004
Mahogany	42	2003	n.a.	n.a.
Cassia Siamea (Johar)	358	2003	n.a.	n.a.
Rosewood	122	2003	42,500	2004
B. Case study site in Bima[c]				
Types of trees	Schemes (Villages)			
	Coppice regeneration (Ntori)		*HTI swakelola* (Nggelu)	
	Σ trees	Planting year	Σ trees [b]	Planting year
Teak	800	Planted in 1966/1968, cut in 1984 and regenerated in 1999	7,790	2002

Notes:

a. These standing stocks were below the standard requirement following Perhutani silviculture guidelines due to intensive forest encroachment and illegal logging. The ideal standing stocks imposed by Perhutani were 1,100 trees/ha (with planting distance 3 x 3 m).

b. Combining standing stocks planted by Perhutani and stocks newly planted under the government National Social Forestry Program.

c. Standard planting distance in Bima: Ntori plantations used 5 x 5 m (standard of total 400 trees per hectare, to allow more spaces for inter-cropping) and in Nggelu the distance was initially based on 2 x 3 m (standard of 1,650 trees/ha).

B1b. Types of timber: based on field observations, survey and focus group discussions, the range of timber species used in community tree-growing schemes in Sumbawa included: teak (*Tectona grandis), Cassia siamea,* Indonesian rosewood (*Dalbergia latifolia*), and mahogany (*Swietenia macrophylla*).

B1c. Initial standing stocks: the data were based on actual number of trees collected during the survey and on field observations. Due to forest encroachment and illegal logging, existing standing stocks were dependent on the level of commitment of tree growers to maintaining and supervising the state forests

B1d. Thinning: following the silviculture guidelines implemented by the state-owned company, Perhutani, and the Forestry District Agency, thinning operations cut out 20% of the tree population in years 5, 10 and 15. The need for thinning depended on the existing tree population per hectare and on when specific trees were planted. Where tree density per hectare was low due to illegal logging, no thinning was required. See (3) point (3) under Section 2b for more details in conjunction with information on estimated labour costs.

B1e. Final harvesting: final harvesting was scheduled at the end of one rotation (25 years) for all types of timber species (following Perhutani guidelines), since most of the timber species were slow growing.

B1f. Timber volume per tree: for thinning and final harvesting, standard timber volumes per tree were used by taking into account the overall climatic conditions at the case study sites as much as possible. These were compiled from different sources and results of studies that were conducted in other places, since no specific research on Sumbawa site has ever been conducted.

Appendix Table 4-3.3. Timber volumes by type and year

Year	Trees at a given tree ages (m3)							
	Teak (Gunung Kidul, Sumbawa & Bima)	Teak (Bulukumba)	Mahogany	*Gmelina arborea*	*Paraseriathes falcataria* (Bulukumba)	*Cassia siamea* (Johar, Sumbawa)	Indonesian rosewood	*Vitex cofassus* (Bulukumba)
5	0.01	0.08	0.12	0.27	0.63	0.12	0.06	0.09
10	0.09	0.17	0.14	0.39	1.51	0.14	0.08	0.12
15	0.22	0.32	0.24	0.43	2.23	0.24	0.14	0.13
20	0.37	0.18	0.34	0.48	2.99	0.34	0.15	0.22
25	0.53	0.24	0.45	0.57	3.74	0.45	0.25	0.24
30	0.73	0.57	0.63	0.64	4.49	0.63	0.47	0.28
35	0.94	0.63	0.85	0.71	5.24	0.85	0.63	0.32

Sources:
a. FORDA (2006)
b. BPK Makassar (2006)
c. Bustomi *et al.* (2006)

B1g. Timber prices: timber prices were based on the local market of wood bought by the local processing industries as presented in Appendix Table 4-3.4. For sensitivity analysis, prices were adjusted against inflation rates (see Appendix Table 4-3.5).

Appendix Table 4-3.4. Timber prices in the local processing industries

A. Sumbawa			**B. Bima**		
Types of trees	Rp/m³	AUD/m³	Types of	Rp/m³	AUD/m³
Teak at 10 years	1,190,595	141	Teak at 5	77,786	9
Teak at 15 years	1,984,325	235	Teak at 10	606,486	72
Teak at 20 years	2,778,055	329	Teak at 15	1,449,643	172
Teak at 25 years	3,968,650	471	Teak at 20	2,430,732	288
Cassia siamea at 25 years	1,666,833	198	Teak at 25	3,500,000	415
Mahogany at 25 years	3,968,650	471			
Rosewood at 25 years	2,619,309	311			

Appendix Table 4-3.5. Round-wood prices for different types of wood, adjusted for price increases

Types of wood	Unit	Initial price	Price increases		
			3% a/	5.5% b/	10% c/
Teak	Rp	3,968,650	4,087,710	4,186,926	4,365,515
	AUD	471	485	497	518
Rosewood	Rp	2,619,309	2,697,888	2,763,371	2,881,240
	AUD	311	320	328	342
Johar	Rp	1,666,833	1,716,838	1,758,509	1,833,516
	AUD	198	204	209	217
Mahogany	Rp	3,968,650	4,087,710	4,186,926	4,365,515
	AUD	471	485	497	518

File: Timber price 3% CF Lamenta.xls-Timber price projection

Notes:

a. The 3% price increase was based on average major log price increases in Indonesia monitored by ITTO from 1998 to 2009.

b. The 5.5% price increase was based on the price increase at wood-trader level.

c. The 10% price increase was based on the government standard for the estimated timber price increase for budgeting purposes.

Sources: a. ITTO (1998-2009)

b. and c. (FDA-Forestry District Agency, Pers. Comm. 11/11/2010).

B2. COST COMPONENTS

B2a. Government expenses

B2a.1. Sources of data: due to limited information on the actual government expenses, especially information on previous government projects, data were estimated based on documents related to state planning, budgeting and expenditures, adjusted to current values (2009) using CPI (Consumer Price Index) (see Appendix Table 4-3.28).

B2a.2. Nature of government expenses: As explained in Section 4.4 (Chapter 4), the current standing stocks managed under community tree-growing schemes were resulted from government-based projects invested in the past, long before community members were involved. Expenditures invested included various types of costs (explained below); however, in the analysis of this PhD thesis, all of these costs are considered as government expenses. One of the reasons is because investment in initiating the plantations has been used by the government as the basis to reclaim timber benefits until now.

B2a.3. Government expenses in Sumbawa: Initial planting was funded by Perhutani (state-owned company), and after the collaboration between the community and the Forestry District Agency was initiated, continuing planting activities were funded under the Social Forestry Program. These data costs were estimated for the whole studied areas. See explanation in Section 4.2 (Chapter 4).

Appendix Table 4-3.6. Expenses made by Perhutani (state-owned company) in Semamung (Sumbawa District) (adjusted values in 2009) (Rp/site studied)

No.	Activities	Year		
		1	2	3
		1994	1995	1996
A	Total investment costs	77,599,063	-	-
B	Operational costs			
1	Planning	900,867	834,879	-
2	Seedlings	131,589,878	239,814,043	174,149,112
3	Planting	145,401,608	157,036,800	165,157,905
4	Maintenance	66,641,636	56,690,803	-
5	Supervision	4,353,625	36,760,981	38,662,068
6	Facilities and infrastructure	66,382,132	115,008,868	120,956,513
7	Education and training	-	23,853,691	25,087,277
8	Research and development	-	47,281,423	49,726,566
	Total operational costs	415,269,748	677,281,488	573,739,441
TOTAL		492,868,812	677,281,488	573,739,441

Appendix Table 4-3.7. Expenses incurred by Perhutani (state-owned company) in Lamenta (Sumbawa District) (adjusted values in 2009) (Rp/site studied)

No.	Activities	Year		
		1	2	3
		1994	1995	1996
A	Total Investment costs	704,051,594	-	-
B	Operational costs			
1	Planning	8,173,515	7,574,808	-
2	Seedlings	1,193,906,979	2,175,818,258	1,580,044,329
3	Planting	1,319,219,970	1,424,785,353	1,498,467,649
4	Maintenance	604,635,522	514,352,217	-
5	Supervisions	39,500,179	333,530,150	350,778,593
6	Facilities and infrastructure	602,281,058	1,043,468,477	1,097,431,099
7	Education and training	-	216,423,092	227,615,339
8	Reasearch and development	-	428,981,485	451,166,119
	Total operational costs	3,767,717,224	6,144,933,841	5,205,503,128

Appendix Table 4-3.8. Expenses incurred in 2004 under Social Forestry Programme in Lamenta (Sumbawa District) (adjusted values in 2009)

Type of expenses	Rp/site	AUD/site
1. Reforestation (seedlings, intercropping development)	59,863,000	7,100
2. Institutional empowering of tree grower cooperatives	66,789,167	7,921
Total	126,652,167	15,020

B2a.4. Government expenses in Bima: This was based on local government initiatives on two projects, the teak coppicing project and self-financed timber plantations *(HTI Swadaya)*. Therefore, the nature of government expenses is quite different from Sumbawa. See explanation in Section 4.3 (Chapter 4).

Appendix Table 4-3.9. Teak coppicing project in Ntori, Bima District (adjusted values in 2009) (Rp/site studied)

No	Activities	Year				
		1 2002	2 2003	3 2004	....	25 2023
A	Intercropping					
1	Land preparation		187,500			
2	Planting and seedlings distribution		420,000			
3	Maintenance		180,000			
4	Institutional development/NGO assistance		4,500,000			
	TOTAL		5,287,500			
B	Coppicing project					
1	Teak coppices	5,580,000				
2	Extension and supervision (year 1 - 25)	342,857	342,857	342,857	....	342,857
	TOTAL			- -		

Appendix Table 4-3.10. Government expenses under the self-financed timber plantations *(HTI Swadaya)* in Nggelu (adjusted values in 2009) (Rp/site studied)

No	Activities	Year			
		1 1999	2 2000	....	25 2023
A	Intercropping				
1	Land preparation	-	2,083,541	-	-
2	Planting and seedlings distribution	-	4,667,133	-	-
3	Maintenance	-	2,000,200	-	-
4	Institutional development/NGO assistance	-	50,004,991	-	-
	TOTAL A	-	58,755,865	-	-
B	Coppicing project				
1	Teak coppices	62,006,189			
2	Extension and supervision (year 1 - 25)	3,809,902	3,809,902	....	3,809,902
	TOTAL B	65,816,092	3,809,902	....	3,809,902

B2b. Community expenses (as member of cooperatives)

B2b.1. Labour costs: These were calculated from data collected in the survey on family labour allocated to the whole area for managing timber and inter-cropping and taking into account rainy (four months) and dry (eight months) seasons based on the average working day (eight man-hours a day).

B2b.2. Labour for timber maintenance: labour costs were mainly for maintenance and supervising the areas to prevent forest encroachment and illegal logging. The allocation of labour between timber and inter-cropping was based on the allocated lands for each of the crops (see point A). Timber maintenance cost varied according to the number of standing stocks, which is changed after scheduled thinning and harvesting.

B2b.4. Labour wages: labour costs were calculated by using wages for paid labour working in the agricultural sector (Rp 23,812-AUD 2.82), which was calculated from data collected in the survey.

B2b.5. Harvesting cost: the standard local costs per cubic metre of timber harvesting included the costs for renting a chain saw and operators and for buying fuel, and the labour required for wood skidding.

B2b.3. Decreasing labour costs in accordance to the decreasing number of standing stocks in each village studied following each treatment of thinning.

Appendix Table 4-3.11. Expenses on labour in Semamung Village (Sumbawa District) (adjusted values in 2009)

Year of thinning and harvesting	Ages of trees (Year)	Number of trees	Number of trees after each thinning/ harvesting	Decreasing labour costs for maintenance (Rp/total areas)
2005	10	443	18,177	17,059,846
2009	20	358	17,734	16,644,073
2010	15	354	17,376	16,308,075
2015	20	284	17,022	15,975,457
2020	25	4,456	16,738	15,709,362
2022 (Mahogany)	20	42	12,282	a
2022 (Rosewood)	20	122	12,240	a

Notes: a. Included in harvesting costs.

Appendix Table 4-3.12. Expenses on labour in Lamenta Village (Sumbawa District) (adjusted values in 2009)

Activities	Year of thinning and harvesting	Ages of trees (Year)	Number of trees	Remaining stocks after each thinning	Labour costs (Rp/total areas)
Before thinning (teak Perhutani)	2001-2008	1-14	4,581	4,581	8,362,619
Thinning 1	2008	15	916	3,665	6,690,095
Thinning 2	2013	20	733	2,932	5,352,076
Harvesting	2018	25	2,932	-	a
Before thinning (teak Social Forestry)	2001-2008	0-5	42,500	42,500	77,587,167
Thinning 1	2008	5	8,500	34,000	62,069,733
Thinning 2	2013	10	6,800	27,200	49,655,787
Thinning 3	2018	15	5,440	21,760	39,724,629
Thinning 4	2023	20	4,352	17,408	31,779,703
Harvesting	2028	25	17,408	-	a
Before thinning (Rosewood)	2001-2008	5	8,500	34,000	77,587,167
Thinning 1	2008				62,069,733
Thinning 2	2013	10	6,800	27,200	49,655,787
Thinning 3	2018	15	5,440	21,760	39,724,629
Thinning 4	2023	20	4,352	17,408	31,779,703
Harvesting	2028	25	17,408	-	a

Notes: a. Included in harvesting costs.

Appendix Table 4-3.13. Expenses on labour in Ntori Village (Bima District) (adjusted values in 2009)

Year of thinning and harvesting	Ages of trees (Year)	Number of trees	Number of trees after each thinning/ harvesting	Decreasing labour costs for maintenance (Rp/total areas)
2002	0-5	800	800	3,169,379
2008	10	160	640	2,535,504
2013	15	128	512	2,028,403
2018	20	102	410	1,622,722
2023	25	410	-	a

Notes: a. Included in harvesting costs.

Appendix Table 4-3.14. Expenses on labour in Nggelu Village (Bima District) (adjusted values in 2009)

Year of thinning and harvesting	Ages of trees (Year)	Number of trees	Number of trees after each thinning/ harvesting	Decreasing labour costs for maintenance (Rp/total areas)
2006	5	1,558	6,232	7,152,951
2011	10	1,246	4,986	5,722,360
2016	15	997	3,988	4,577,888
2021	20	798	3,191	3,662,311
2026	25	3,191	-	a

Notes: a. Included in harvesting costs.

Appendix Table 4-3.15. The standard harvesting cost per m³

A. Case study site in Sumbawa		
Types of trees	Harvesting costs (Rp/m³)	Harvesting costs (AUD/m³)
Teak at 10 years	14,507	1.72
Teak at 15 years	27,741	3.29
Teak at 20 years	37,212	4.41
Teak at 25 years	842,148	99.88
Cassia siamea at 25 years	381,784	45.28
Mahogany at 25 years	842,148	99.88
Rosewood at 25 years	572,279	67.87
B. Case study site in Bima		
Types of trees	Harvesting costs (Rp/m³)	Harvesting costs (AUD/m³)
Teak at 5 years	10,557	1.25
Teak at 10 years	82,309	9.76
Teak at 15 years	196,737	23.33
Teak at 20 years	329,885	39.12
Teak at 25 years	475,000	56.33

B2b.6. Transportation costs:

Costs for transporting timber from farm gate to the nearest saw mills: Rp 290,164 (AUD 34) per m³ (WWF Indonesia Program Nusa Tenggara, 2007a).

B2b.7. Acquiring certificate of validity of forest products (*SKSHH-Surat Keterangan Sahnya Hasil Hutan*): as required according to the Ministry of Forestry regulation, timber harvesting requires a certificate of validity of forest products in confirming the origin of the products, which is costed at Rp 39,687 (AUD 4.71) per m³ in Sumbawa as imposed by local government. In Bima, the local government applied Rp 145,253 (AUD 17.23) per m³.

B2b.8. Cooperative membership fees: as members of the cooperative, tree growers have the obligation to pay a once-off registration fee (Rp 15,900 or AUD 1.89), as well as an annual contribution fee (Rp 795 or AUD 0.09). There is no membership fee in Bima.

B2b.9. Forest resources provision (*Provisi Sumber Daya Hutan-PSDH*): This provision is imposed by Mo F's regulation for any timber extraction from state forests. Similar rates applied in Sumbawa and Bima. The rates applied to total volume of timber harvested.

Appendix Table 4-3.16. Forest resources provision standard

Diameter	Provision (Rp/m3)	Provision (AUD/m3)
Less than 19 cm	30,479	3.61
20-29 cm	76,992	9.13
More than 30 cm	118,266	14.03

C. Inter-cropping crops

C1. Estimating revenues from inter-cropping: in addition to timber, revenue comes from crops planted by tree growers in between timber trees (inter-cropping), especially where the number of timber trees per hectare was low, leaving spacious areas to be utilised for inter-cropping.

C1.a. Planted areas: for total areas studied
C1.b. Productivity: based on average figures from data collected in the survey
C1.c. Price: based on average figures from data collected in the survey
C1.d. Values are adjusted to 2009 values using CPI

C2. Frequency of harvesting: harvesting frequency was dependent on the ages of timber trees and tree density per hectare, since bigger trees and dense trees allowed less sunshine through, which reduced the capacity to grow these food crops productively.

C3. Types of plants for inter-cropping: inter-cropping practices mainly used a combination of different crops planted by the local community.

Appendix Table 4-3.17. Revenues and costs for crops planted in Semamung (Sumbawa District): paddy and mungbean

Revenues from inter-cropping					
Crops	**Productivity (kg/ha)**	**Price (Rp/kg)**	**Planted areas**	**Total revenues in 2004 value (Rp)**	**Total revenues in 2009 value (Rp)**
Paddy	1,538	900	21.33	29,515,000	46,853,883
Mungbean	364	3,800	20.99	29,050,000	46,115,714
Total	-	-	34.43	58,565,000	92,969,597

Total costs for inter-cropping			
Type of costs	**Costs (Rp/ha)**	**Total costs in 2004 value (Rp)**	**Total costs in 2009 value (Rp)**
1. Seedling costs			
Paddy	195,011	4,159,585	6,603,174
Mungbean	196,333	4,121,030	6,541,970
TOTAL SEEDLINGS		8,280,614	13,145,144
2. Land preparation	37,605	1,591,444	2,526,353
3. Chemical weeding	58,571	2,478,725	3,934,876
4. Spraying	66,559	2,816,777	4,471,521
5. Fertilisers	146,995	6,220,828	9,875,316
TOTAL MAINTENANCE		13,107,774	20,808,067
6. Total labour		27,478,570	43,690,926
TOTAL COSTS		48,866,958	77,644,137

Appendix Table 4-3.18. Revenues and costs for crops planted in Lamenta (Sumbawa District): ginger and turmeric

Revenues from inter-cropping

Crops	Production (kg/ha)	Price (kg/ha)	Planted areas (ha)	Total revenues in 2004 value (Rp)	Total revenues in 2009 value (Rp)
Ginger	1,660	7,500	25.00	311,250,000	494,096,936
Turmeric	1,660	1,000	25.00	41,500,000	65,879,592
Total	-	-		352,750,000	559,976,528

Total costs for inter-cropping

Type of costs	Costs/ha (Rp/ha)	Total costs in 2004 value (Rp)	Total costs in 2009 value (Rp)
1. Seedling			
Ginger	186,075	4,651,875	7,384,666
Turmeric	24,810	620,250	984,622
TOTAL SEEDLINGS		5,272,125	8,369,288
2. Land preparation	37,605	1,880,250	2,984,822
3. Chemical weeding	58,571	2,928,550	4,648,956
4. Spraying	66,559	3,327,950	5,282,988
5. Fertilisers	146,995	7,349,750	11,667,434
TOTAL MAINTENANCE		15,486,500	24,584,200
6. Total labour		11,222,004	17,814,483
TOTAL COSTS		31,980,629	50,767,970

C3c. Revenues and costs for crops planted in Ntori (Bima District)

Appendix Table 4-3.19. Crops: paddy and turmeric

Revenues from inter-cropping					
Crops	Production (kg/ha)	Price (kg/ha)	Planted areas (ha)	Total revenues in 2004 value (Rp)	Total revenues in 2009 value (Rp)
Paddy	4,504	1,034	4.30	20,037,537	31,808,789
Mungbean	56,865	500	0.44	12,606,932	20,013,001
Total	-	-	4.75	32,644,469	51,821,790

Total costs for inter-cropping			
Type of costs	Costs (Rp/ha)	Total costs in 2004 value (Rp)	Total costs in 2009 value (Rp)
1. Seedling costs/ha			
Paddy	264,286	1,137,055	1,805,030
Turmeric	24,810	11,001	17,463
Cashew nuts	267,857	10,234	16,246
Candle nuts	421,429	32,203	51,122
TOTAL SEEDLINGS			1,889,861
2. Land preparation	21,429	101,697	161,440
3. Chemical weeding	53,571	254,235	403,588
4. Spraying	76,339	362,287	575,116
5. Fertilisers	181,224	860,046	1,365,289
TOTAL MAINTENANCE	332,563	1,578,265	2,505,433
6. Total labour		3,400,537	5,406,854
TOTAL COSTS		4,978,802	9,802,148

Appendix Table 4-3.20. Crops: candle and cashew nuts

Year	Cashew nuts (Total number of trees: 50 for total area; Price: Rp 7,937/kg; Harvesting costs: Rp 794/kg)		Candle nuts (Total number of trees: 100 for total area; Price: Rp 1,587/kg; Harvesting costs: 159/kg)	
	Production (kg/tree/year)	Revenues (Rp)	Production (kg/tree/year)	Revenues (Rp)
1				
2				
3	3.00	1,190,595		
4	3.60	1,428,714		
5	4.32	1,714,457	20	3,174,920
6	5.18	2,057,348	30	4,762,380
7	6.22	2,468,818	40	6,349,840
8	7.46	2,962,581	50	7,937,300
9	8.96	3,555,098	60	9,524,760
10	7.46	2,962,581	70	11,112,220
11	6.22	2,468,818	80	12,699,680
12	5.18	2,057,348	90	14,287,140
13	4.32	1,714,457	100	15,874,600
14	3.60	1,428,714	100	15,874,600
15	3.00	1,190,595	90	14,287,140
16			80	12,699,680
17			70	11,112,220
18			60	9,524,760
19			50	7,937,300
20			40	6,349,840

C3d. Revenues and costs for crops planted in Nggelu (Bima District):

Appendix Table 4-3.21. Crops: paddy, corn, soybean, and sesame

Revenues from inter-cropping: Paddy, corn, soybean, and sesame					
Crops	Production (kg/ha)	Price (kg/ha)	Planted areas (ha)	Total revenues in 2004 value (Rp)	Total revenues in 2009 value (Rp)
Paddy	1,564	813	11.14	14,166,000	22,487,959
Corn	6,339	250	0.59	940,000	1,492,212
Soybean	7,924	600	1.01	4,800,000	7,619,808
Sesame	7,924	800	0.42	2,680,000	4,254,393
Total			13.17	22,586,000	35,854,372

Total costs for inter-cropping			
Type of costs	Costs/ha (Rp/ha)	Total costs in 2004 value (Rp)	Total costs in 2009 value (Rp)
1. Seedling costs			
Paddy	159,737	1,780,137	2,825,896
Corn	12,300	7,296	11,582
Soybean	127,500	128,725	204,346
Sesame	16,000	6,764	10,738
Cashew nuts	267,857	5,357,140	8,504,246
TOTAL SEEDLINGS		7,280,062	11,556,807
2. Land preparation	65,958	868,647	1,378,942
3. Chemical weeding	68,571	903,059	1,433,571
4. Spraying	47,000	618,976	982,599
5. Fertilisers	78,536	1,034,295	1,641,902
TOTAL MAINTENANCE	260,065	3,424,977	5,437,014
6. Total labour		8,674,090	13,791,803
TOTAL COSTS		19,379,129	30,785,624

Appendix Table 4-3.22. Cashew nuts

Year	Cashew nuts (Total number of trees: 174 for total area; Price: Rp 7,937/kg; Harvesting costs: Rp 794/kg)	
	Production (kg/tree/year)	Revenues (Rp)
1		
2		
3	3.00	4,143,271
4	3.60	4,971,925
5	4.32	5,966,310
6	5.18	7,159,572
7	6.22	8,591,486
8	7.46	10,309,783
9	8.96	12,371,740
10	7.46	10,309,783
11	6.22	8,591,486
12	5.18	7,159,572
13	4.32	5,966,310
14	3.60	4,971,925
15	3.00	4,143,271

Appendix Table 4-3.23. Higher productivity for each crop

Villages	Crops	Higher productivity (kg/ha)
Nggelu	Paddy	5,271
	Corn	9,750
	Soybean	9,205
	Sesame	8,324
Ntori	Candle nuts	64
	Cashew nuts	8
Ntori/Semamung	Paddy	7,112
	Mungbean	57,809
Lamenta	Ginger	3,000
	Turmeric	3,000

Sources: Dinas Pertanian Sumbawa (2006); BPS Sumbawa (2008); BPS Bima (2010)

D. Other revenues: salvage value of farming tools

D1. Salvage values: these values are basically the values remaining after the tools were used in certain years that are shorter than the total values for the whole economic year.

D2. Economic life of farming tools: the information on the economic life of different farming tools was based on information collected from tree growers during the survey.

Appendix Table 4-3.24. Economic life of farming tools

Tools	Average economic life (year)	Unit price (Rp)	Unit price (AUD)
A. Case study site in Sumbawa			
Hoe	5	25,221	2.99
Crowbar	4	21,542	2.55
Cleaver	4	45,609	5.41
Axe	5	27,142	3.22
Traditional sickle	3	24,271	2.88
Sickle	1	6,762	0.80
B. Case study site in Bima			
Tools	Average economic life (year)	Unit price (Rp)	Unit price (AUD)
Hoe	4	28,750	3.41
Crowbar	6	25,232	2.99
Cleaver	4	43,046	5.11
Axe	7	77,214	9.16
Traditional sickle	3	27,143	3.22
Sickle	4	7,250	0.86

Appendix Table 4-3.25. Discounted cost value by component for timber and inter-cropping

Cost components	Community tree growing schemes			
	Sumbawa		Bima	
	Rp (million)	AUD	Rp (million)	AUD
1. Government expenses [a]	7,575	898,414	104	12,388
2. Intercropping and timber expenses				
2.1. Farming tools [b]	44	5,200	16	1,840
2.2. Intercropping crops [c]	572	67,825	122	14,427
2.3. Timber				
a. Labour on timber maintenance	733	86,922	47	5,624
b. Timber harvesting	799	94,703	88	10,453
c. Certifcate of validity of forest products [d]	76	9,059	36	4,308
d. Cooperative membership fees				
d1. Registration fees	1	152	-	-
d2. Annual fees	1	73	-	-
e. Forest resource provision [e]	373	44,274	28	3,331
f. Government-based land rent and tax	27	3,175	1	154
Total 2.3.	2,010	238,358	201	23,869
3. Transporting timber	828	98,179	97	11,494
Total costs (1 + 2 + 3)	11,029	1,307,976	540	64,018
Costs per ha (Rp million)	-	-	45	31
Costs per ha (AUD)	-	-	5,306	3,712

File: C:\Users\ANawir\Documents\Thesis\Thesis revision\Excel tables\Costs.xlsx-Timber & intercropping

Notes:

a. Estimation of present value following CBA using 8% discount rate.
b. Expenses allocated by state-owned company and government at central, provincial and minor contribution from district government.
c. Farming tools are jointly used by timber and inter-cropping crops.
d. For detailed costs for inter-cropping crops see point C in this Appendix 4-3
e. Refers to *SKSHH-Surat Keterangan Sahnya Hasil Hutan* (see Table 4-3, Chapter 4 and point B2b.9 in this Appendix 4-3).
f. Refers to *PSDH-Provisi Sumber Daya Hutan* (see Table 4-3 and point B2b.9 in this Appendix 4-3).
g. The cost per ha was calculated based on the area existing with the remaining standing stock after illegal logging and/or forest encroachment.

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

Appendix Table 4-3.26. **Discounted cost value by component for timber management**

Cost components	Community tree growing schemes			
	Sumbawa		Bima	
	Rp (million)	AUD	Rp (million)	AUD
1. Government expenses [a]	7,575	898,414	100	11,916
2. Intercropping and timber expenses				
2.1. Farming tools [b]	27	3,208	6	667
2.2. Intercropping crops [c]	-	-	-	-
2.3. Timber				
a. Labour on timber maintenance	733	86,922	47	5,624
b. Timber harvesting	799	94,703	88	10,453
c. Certifcate of validity of forest products [d]	76	9,059	36	4,308
d. Cooperative membership fees				
d1. Registration fees	1	152	-	-
d2. Annual fees	1	73	-	-
e. Forest resource provision [e]	373	44,274	28	3,331
f. Government-based land rent and tax	27	3,175	1	154
Total 2.3.	2,010	238,358	201	23,869
3. Transporting timber	828	98,179	97	11,494
Total costs (1 + 2 + 3)	10,440	1,238,159	404	47,947

File: C:\Users\ANawir\Documents\Thesis\Thesis revision\Excel tables\Costs.xlsx-Timber

Notes:

h. Estimation of present value following CBA using 8% discount rate.
i. Expenses allocated by state-owned company and government at central, provincial and minor contribution from district government.
j. Farming tools are jointly used by timber and inter-cropping crops.
k. For detailed costs for inter-cropping crops see point C in this Appendix 4-3
l. Refers to *SKSHH-Surat Keterangan Sahnya Hasil Hutan* (see Table 4-3, Chapter 4 and point B2b.9 in this Appendix 4-3).
m. Refers to *PSDH-Provisi Sumber Daya Hutan* (see Table 4-3 and point B2b.9 in this Appendix 4-3).
n. The cost per ha was calculated based on the area existing with the remaining standing stock after illegal logging and/or forest encroachment.

Source: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2002-2005).

E. Discount rates and prices

E1. Discount rates: real discount rates

As explained in Chapter 3 (Section 3.3.3), in responding to inflation, the real discount rate was used in this analysis, and constant prices were used for all inputs and outputs (Perkins, 1994). In Indonesia, the average interest rate for commercial loans at bank at regional level in 2008 was 13.52%, with an expected inflation rate for 2010 of 5% (±1%), (Bank of Indonesia, 2009). Using these data and following the formula, the real discount rate used in this thesis was 8%. For the sensitivity analysis as explained in Section 3.3.3 in Chapter 3, see table Appendix Table 4-3.27 on the estimated discount rates in three scenarios of inflation rate.

Appendix Table 4-3.27. Discount rates in three scenarios of inflation rate

Scenarios of the economic condition in Indonesia [a]	Inflation rate	Real discount rates
1. Worst scenario: Based on the conditions when the Asian economic crisis hit its lowest level, resulting in the highest inflation rate in Indonesia	78%	(36%)
2. Moderate scenario: Based on the average of the inflation rates in 1994 and 2000, and considered to be moderate economic conditions	9%	4%
3. Best scenario: Based on the lowest inflation rate, which occurred in 1999	2%	12%

File: IMF historical inflation rate.xls

Notes:
a. Based on the analysis of the historical trend of inflation rates for the past 17 years (1993–2009).
Source: analysed from (IMF, 2010).

E2. Prices

All prices were valued in 2009 following the last data collected in 2009 for community-company partnership schemes. The CPI was used to adjust all prices in the analysis, taking into account inflation rates, as described in table Appendix Table 4-3.27. For Sumbawa, the adjustment used the CPI in *Mataram* as the capital city of West Nusa Tenggara Province where Sumbawa District is located. There are no CPI data published at district level.

E3. Exchange rates

One AUD (Australian Dollar) = Rp 8,432 (2009)

Appendix Table 4-3.28. CPI in selected cities

Year	CPI in selected cities (2002=100)					
	Jambi	Pontianak	Makassar	Mataram [a/]	Yogyakarta	Indonesia
1994				30.43		
1995				33.13		
1996				35.28		
1997				38.03		
1998	68.32	65.20	63.51	60.39	60.67	64.83
1999	81.45	77.30	79.15	78.20	74.74	78.15
2000 [b/]	80.83	80.71	81.78	78.46	79.32	81.13
2001	90.26	89.86	89.69	87.78	87.87	90.46
2002	101.15	100.49	99.41	99.11	99.09	100.03
2003	107.36	105.98	104.75	104.08	108.00	106.78
2004	114.61	112.46	109.89	109.34	114.69	113.25
2005	126.40	122.38	120.99	121.56	126.50	125.09
2006	143.31	137.47	137.84	136.67	144.59	141.48
2007	158.11	147.34	145.68	146.04	156.54	150.55
2008	175.94	165.07	161.08	163.18	173.95	167.32
2009	185.23	176.89	169.68	173.58	183.11	175.62

Notes:

a. The CPI was calculated from 1994 because government investment data were calculated from 1994 onwards.

b. CPI figures in 2002 were not equal to 100 as was supposedly the case for CPI at the base year. CPI was calculated using published figures that were in turn calculated using a different base year following the changes in methods used by BPS:

- CPI in Jambi is calculated to adjust the prices used in community-company partnership scheme in Jambi
- CPI in Pontianak is calculated to adjust the prices used in community-company partnership scheme in Sanggau
- CPI in Makassar is calculated to adjust the prices used in private tree-growing schemes in Bulukumba
- CPI in Yogyakarta is calculated to adjust the prices used in private tree-growing schemes in Gunung Kidul
- CPI in Mataram is calculated to adjust the prices used in community tree-growing schemes in Sumbawa and Bima.

Sources: BPS (1994; 1995; 1996; 1997; 1998; 1999; 2000; 2001; 2002; 2003; 2004; 2005a; 2006; 2007; 2008; 2009).

Appendix Table 4-3.29. Cash flows of timber and inter-cropping crops in Lamenta Village (Sumbawa District) (Rp 000,000/total studied area)

Cash flow components		Year											
		1	2	3	4	5	6	7	8	9	10	11	12
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A. REVENUES													
A1. Wood													
1	Teak 1 (ex-Perhutani)	-	-	-	-	399	-	-	-	-	750	-	-
2	Teak 2 (Social Forestry)	-	-	-	-	80	-	-	-	-	744	-	-
3	Rosewood (Social Forestry)	-	-	-	-	174					283		
	TOTAL A1	-	-	-	-	653	-	-	-	-	1,777	-	-
A2. Intercropping crops													
1	Ginger	494	494	494	494	494	494	494	494	494	494	494	494
2	Turmeric	66	66	66	66	66	66	66	66	66	66	66	66
	TOTAL A2	560	560	560	560	560	560	560	560	560	560	560	560
A3. Salvage values from farming tools													
1	Cleaver	-	-	-	-	-	-	-	-	-	-	-	-
2	Ax	-	-	-	-	-	-	-	-	-	-	-	-
3	Traditional sickle	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL A3	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL REVENUES		560	560	560	560	1,213	560	560	560	560	2,337	560	560
B. COST													
B1. Government expenses													
1	Investment and operational costs (Teak 1)	4,472	6,145	5,206	-	-	-	-	-	-	-	-	-
2	Investment and operational costs (Teak 2)	127	-	-	-	-	-	-	-	-	-	-	-
	TOTAL B1	4,598	6,145	5,206	-	-	-	-	-	-	-	-	-
B2. Cooperative members expenses													
B2.1. Tools (Jointly used by timber & inter-crops)													
1	Hoe	3	-	-	-	-	3	-	-	-	-	3	-
2	Crowbar	0.34	-	-	-	-	0.34	-	-	-	-	0.34	-
3	Cleaver	7	-	-	-	7	-	-	-	7	-	-	-
4	Ax	0.46	-	-	-	-	-	-	0.46	-	-	-	-
5	Traditional sickle	2	-	-	2	-	-	2	-	-	2	-	-
6	Sickle	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
	TOTAL B2.1.	13	0.49	0.49	2	8	3	2	1	8	2	3	0.49
B2.2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-	-
1	Seedlings	8	8	8	8	8	8	8	8	8	8	8	8
2	Land preparation and fertilisers	25	25	25	25	25	25	25	25	25	25	25	25
3	Labour	18	18	18	18	18	18	18	18	18	18	18	18
	TOTAL B2.2.	33	33	33	33	33	33	33	33	33	33	33	33
B2.3. Timber		-	-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance	164	164	164	164	131	131	131	131	131	105	105	105
2	Timber harvesting	-	-	-	-	45	-	-	-	-	157	-	-
3	Aquiring certifcate of validity of forest products	-	-	-	-	12	-	-	-	-	36	-	-
4	Cooperative membership fees	-	-	-	-	-	-	-	-	-	-	-	-
	4a. Regristration fee	2	-	-	-	-	-	-	-	-	-	-	-
	4b. Annual fee	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5	Forest resources provision (PSDH)	-	-	-	-	27	-	-	-	-	80	-	-
	TOTAL B2.3.	166	164	164	164	215	131	131	131	131	377	105	105
TOTAL COOPERATIVE EXPENSES		212	197	197	199	256	167	166	165	172	413	141	138
B3. Additional expenses		-	-	-	-	-	-	-	-	-	-	-	-
B3.1. Land rent (Rp 9000/ha)		5	5	5	5	5	5	5	5	5	5	5	5
B3.2. Transporting timber		-	-	-	-	240	-	-	-	-	425	-	-
	TOTAL B3	5	5	5	5	245	5	5	5	5	430	5	5
TOTAL COOPERATIVE EXPENSES (include land rent and transporting timber)		217	202	202	204	501	172	171	169	176	843	146	143

	Cash flow components	Year												
		13	14	15	16	17	18	19	20	21	22	23	24	25
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
A. REVENUES														
A1. Wood														
1	Teak 1 (ex-Perhutani)	-	-	6,170	-	-	-	-	-	-	-	-	-	-
2	Teak 2 (Social Forestry)	-	-	2,371	-	-	-	-	4,453	-	-	-	-	36,637
3	Rosewood (Social Forestry)			619					774					7,095
	TOTAL A1	-	-	9,160	-	-	-	-	5,227	-	-	-	-	43,731
A2. Intercropping crops														
1	Ginger	494	494	494	494	494	494	494	494	494	494	494	494	494
2	Turmeric	66	66	66	66	66	66	66	66	66	66	66	66	66
	TOTAL A2	560	560	560	560	560	560	560	560	560	560	560	560	560
A3. Salvage values from farming tools														
1	Cleaver	-	-	-	-	-	-	-	-	-	-	-	-	6
2	Ax	-	-	-	-	-	-	-	-	-	-	-	-	0.20
3	Traditional sickle	-	-	-	-	-	-	-	-	-	-	-	-	1
	TOTAL A3	-	-	-	-	-	-	-	-	-	-	-	-	7
TOTAL REVENUES		560	560	9,720	560	560	560	560	5,787	560	560	560	560	44,298
B. COST														
B1. Government expenses														
1	Investment and operational costs (Teak 1)	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Investment and operational costs (Teak 2)	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL B1	-	-	-	-	-	-	-	-	-	-	-	-	-
B2. Cooperative members expenses														
B2.1. Tools (Jointly used by timber & inter-crops)														
1	Hoe	-	-	-	3	-	-	-	-	3	-	-	-	-
2	Crowbar	-	-	-	0.34	-	-	-	-	0.34	-	-	-	-
3	Cleaver	7	-	-	-	7	-	-	-	7	-	-	-	7
4	Ax	-	-	0.46	-	-	-	-	-	-	0.46	-	-	-
5	Traditional sickle	2	-	-	2	-	-	2	-	-	2	-	-	2
6	Sickle	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
	TOTAL B2.1.	10	0.49	1	5	8	0.49	2	0.49	11	3	0.49	0.49	10
B2.2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-	-	-
1	Seedlings	8	8	8	8	8	8	8	8	8	8	8	8	8
2	Land preparation and fertilisers	25	25	25	25	25	25	25	25	25	25	25	25	25
3	Labour	18	18	18	18	18	18	18	18	18	18	18	18	18
	TOTAL B2.2.	33	33	33	33	33	33	33	33	33	33	33	33	33
B2.3. Timber		-	-	-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance	105	105	79	79	79	79	79	64	64	64	64	64	-
2	Timber harvesting	-	-	1,087	-	-	-	-	591	-	-	-	-	4,897
3	Aquiring certifcate of validity of forest products	-	-	109	-	-	-	-	64	-	-	-	-	366
4	Cooperative membership fees	-	-	-	-	-	-	-	-	-	-	-	-	-
	4a. Regristration fee	-	-	-	-	-	-	-	-	-	-	-	-	-
	4b. Annual fee	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
5	Forest resources provision (PSDH)	-	-	325	-	-	-	-	190	-	-	-	-	1,092
	TOTAL B2.3.	105	105	1,601	80	80	80	80	907	64	64	64	64	6,356
TOTAL COOPERATIVE EXPENSES		148	138	1,635	118	120	113	115	941	108	100	97	97	6,398
B3. Additional expenses		-	-	-	-	-	-	-	-	-	-	-	-	-
B3.1. Land rent (Rp 9000/ha)		5	5	5	5	5	5	5	5	5	5	5	5	5
B3.2. Transporting timber		-	-	1,016	-	-	-	-	660	-	-	-	-	3,926
	TOTAL B3	5	5	1,020	5	5	5	5	664	5	5	5	5	3,931
TOTAL COOPERATIVE EXPENSES (include land rent and transporting timber)		152	143	2,655	123	125	118	120	1,605	112	104	102	102	10,329

Appendix Table 4-3.30. Cash flows of timber and inter-cropping crops in Semamung Village (Sumbawa District) (Rp 000,000/total studied area)

	Cash flow components	Year										
		1	2	3	4	5	6	7	8	9	10	11
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
A. REVENUES												
A1. Wood												
1	Teak	-	-	-	-	48	-	-	-	-	154	-
2	Mahogany	-	-	-	-	-	-	-	-	-	-	-
3	*Cassia siamea*	-	-	-	-	-	-	-	-	129	-	-
4	Rosewood	-	-	-	-	-	-	-	-	-	-	-
	TOTAL A1	-	-	-	-	48	-	-	-	129	154	-
A2. Inter-cropping crops		-	-	-	-	-	-	-	-	-	-	-
1	Dry-field paddy	47	47	47	47	47	47	47	47	47	47	47
2	Mungbean	46	46	46	46	46	46	46	46	46	46	46
	TOTAL A2	93	93	93	93	93	93	93	93	93	93	93
A3. Salvage values from farming tools		-	-	-	-	-	-	-	-	-	-	-
1	Hoe	-	-	-	-	-	-	-	-	-	-	-
2	Crowbar	-	-	-	-	-	-	-	-	-	-	-
3	Cleaver	-	-	-	-	-	-	-	-	-	-	-
4	Ax	-	-	-	-	-	-	-	-	-	-	-
	TOTAL A3	-	-	-	-	-	-	-	-	-	-	-
TOTAL REVENUES		93	93	93	93	141	93	93	93	222	247	93
B. COST												
B1. Government expenses		-	-	-	-	-	-	-	-	-	-	-
1	Investment costs	78	-	-	-	-	-	-	-	-	-	-
2	Operational costs	415	677	574	-	-	-	-	-	-	-	-
	TOTAL B1	493	677	574	-	-	-	-	-	-	-	-
B2. Cooperative member expenses		-	-	-	-	-	-	-	-	-	-	-
B2.1. Tools (Jointly used by timber and inter-crops)		-	-	-	-	-	-	-	-	-	-	-
1	Hoe	3	-	3	-	3	-	3	-	3	-	3
2	Crowbar	1.12	-	-	-	-	-	-	-	-	1.12	-
3	Cleaver	5	-	-	-	-	5	-	-	-	-	5
4	Ax	5	-	-	-	-	-	-	-	-	-	5
	TOTAL B2.1.	16	-	3	2	3	5	4	-	3	3	13
B2.2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-
1	Seedlings	13	13	13	13	13	13	13	13	13	13	13
2	Land preparation and fertilisers	21	21	21	21	21	21	21	21	21	21	21
3	Labour	44	44	44	44	44	44	44	44	44	44	44
	TOTAL B2.2.	78	78	78	78	78	78	78	78	78	78	78
B2.3. Timber		-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance	17	17	17	17	17	17	17	17	17	16	16
2	Timber harvesting	-	-	-	-	4	-	-	-	29	17	-
3	Aquiring certifcate of validity of forest products	-	-	-	-	2	-	-	-	5	3	-
4	Cooperative membership fees	-	-	-	-	-	-	-	-	-	-	-
	4a. Regristration fee	0.67	-	-	-	-	-	-	-	-	-	-
	4b. Annual fee	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
5	Forest resources provision (PSDH)	-	-	-	-	3	-	-	-	14	6	-
	TOTAL B2.3.	18	17	17	17	26	17	17	17	66	42	16
TOTAL COOPERATIVE EXPENSES		111	95	98	97	106	99	99	95	146	123	106

	Cash flow components	Year										
		12	13	14	15	16	17	18	19	20	21	22
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
A. REVENUES												
A1. Wood												
1	Teak	-	-	-	290	-	-	-	-	9,378	-	-
2	Mahogany	-	-	-	-	-	-	-	-	-	-	36
3	*Cassia siamea*	-	-	-	-	-	-	-	-	-	-	-
4	Rosewood	-	-	-	-	-	-	-	-	-	-	31
	TOTAL A1	-	-	-	290	-	-	-	-	9,378	-	67
A2. Inter-cropping crops		-	-	-	-	-	-	-	-	-	-	-
1	Dry-field paddy	47	47	47	47	47	47	47	47	47	47	47
2	Mungbean	46	46	46	46	46	46	46	46	46	46	46
	TOTAL A2	93	93	93	93	93	93	93	93	93	93	93
A3. Salvage values from farming tools		-	-	-	-	-	-	-	-	-	-	-
1	Hoe	-	-	-	-	-	-	-	-	-	-	2
2	Crowbar	-	-	-	-	-	-	-	-	-	-	0.75
3	Cleaver	-	-	-	-	-	-	-	-	-	-	3
4	Ax	-	-	-	-	-	-	-	-	-	-	5
	TOTAL A3	-	-	-	-	-	-	-	-	-	-	11
TOTAL REVENUES		93	93	93	383	93	93	93	93	9,471	93	171
B. COST												
B1. Government expenses		-	-	-	-	-	-	-	-	-	-	-
1	Investment costs	-	-	-	-	-	-	-	-	-	-	-
2	Operational costs	-	-	-	-	-	-	-	-	-	-	-
	TOTAL B1	-	-	-	-	-	-	-	-	-	-	-
B2. Cooperative member expenses		-	-	-	-	-	-	-	-	-	-	-
B2.1. Tools		-	-	-	-	-	-	-	-	-	-	-
1	Hoe	-	3	-	3	-	3	-	3	-	3	-
2	Crowbar	-	-	-	-	-	-	-	1.12	-	-	-
3	Cleaver	-	-	-	-	5	-	-	-	-	5	-
4	Ax	-	-	-	-	-	-	-	-	-	5	-
	TOTAL B2.1.	-	4	-	3	6	3	-	6	-	13	2
B2.2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-
1	Seedlings	13	13	13	13	13	13	13	13	13	13	13
2	Land preparation and fertilisers	21	21	21	21	21	21	21	21	21	21	21
3	Labour	44	44	44	44	44	44	44	44	44	44	44
	TOTAL B2.2.	78	78	78	78	78	78	78	78	78	78	78
B2.3. Timber		-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance	16	16	16	16	16	16	16	16	12	12	-
2	Timber harvesting	-	-	-	38	-	-	-	-	1,254	-	14
3	Aquiring certifcate of validity of forest products	-	-	-	4	-	-	-	-	94	-	1.32
4	Cooperative membership fees	-	-	-	-	-	-	-	-	-	-	-
	4a. Regristration fee	-	-	-	-	-	-	-	-	-	-	-
	4b. Annual fee	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
5	Forest resources provision (PSDH)	-	-	-	12	-	-	-	-	279	-	4
	TOTAL B2.3.	16	16	16	71	16	16	16	16	1,638	12	20
TOTAL COOPERATIVE EXPENSES		94	98	94	151	100	96	94	99	1,716	102	99
B3. Additional expenses		-	-	-	-	-	-	-	-	-	-	-
B3.1. Land rent (Rp 9000/ha)		0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
B3.2. Transporting timber		-	-	-	40	-	-	-	-	916	-	13
	TOTAL B3	0.46	0.46	0.46	41	0.46	0.46	0.46	0.46	916	0.46	13
TOTAL COOPERATIVE EXPENSES (include land rent and transporting timber)		94	99	94	192	100	97	94	99	2,632	102	112

Appendix Table 4-3.31. Cash flows of timber and inter-cropping crops in Ntori Village (Bima District) (Rp 000,000/total studied area)

	Cash flow components	Year											
		1	2	3	4	5	6	7	8	9	10	11	12
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
A. REVENUES													
A1. Wood													
1	Teak	-	-	-	-	-	-	-	-	-	9	-	-
	TOTAL A1	-	-	-	-	-	-	-	-	-	9	-	-
1	Paddy	-	-	-	-	-	-	-	-	-	-	-	-
2	Corn	32	32	32	-	-	-	-	-	-	-	-	-
4	Cassava	20	20	20	20	20	-	-	-	-	-	-	-
4	Candle nuts	-	-	1.19	1.43	2	2	2	3	4	3	2	2
	TOTAL A2	-	-	-	-	3	5	6	8	10	11	13	14
A3. Salvage values from farming tools		52	52	53	21	25	7	9	11	13	14	15	16
2	Crowbar	-	-	-	-	-	-	-	-	-	-	-	-
3	Cleaver	-	-	-	-	-	-	-	-	-	-	-	-
4	Ax	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL A3	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL REVENUES		52	52	53	21	25	7	9	11	13	23	15	16
B. COST		-	-	-	-	-	-	-	-	-	-	-	-
B1. Government expenses		-	-	-	-	-	-	-	-	-	-	-	-
1	Intercropping	-	59	-	-	-	-	-	-	-	-	-	-
2	Teak coppicing project	66	4	4	4	4	4	4	4	4	4	4	4
	TOTAL B1	66	63	4	4	4	4	4	4	4	4	4	4
B2. Cooperative members expenses		-	-	-	-	-	-	-	-	-	-	-	-
B2.1. Tools (Jointly used by timber & inter-crops)		-	-	-	-	-	-	-	-	-	-	-	-
1	Hoe	0.70	-	-	-	0.70	-	-	-	0.70	-	-	-
2	Crowbar	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	-
3	Cleaver	0.97	-	-	-	0.97	-	-	-	0.97	-	-	-
4	Ax	0.73	-	-	0.73	-	-	0.73	-	-	0.73	-	-
	TOTAL B2.1.	3	-	-	2	2	-	2	-	2	2	-	-
B2.2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-	-
1	Seedlings	2	2	2	2	2	-	-	-	-	-	-	-
2	Land preparation & fertilizers	3	3	3	3	3	-	-	-	-	-	-	-
3	Labour	5	5	6	6	6	6	6	6	7	7	7	7
4	Harvesting for cashew and candle nuts	-	-	0.12	0.14	0.49	0.68	0.88	1.09	1.31	1.41	2	2
	TOTAL B2.2.	10	10	10	10	11	7	7	8	8	8	8	9
B2.3. Timber		-	-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance	3	3	3	3	3	3	3	3	3	2	2	2
2	Timber harvesting	-	-	-	-	-	-	-	-	-	1.21	-	-
3	Aquiring certifcate of validity of forest pr	-	-	-	-	-	-	-	-	-	2	-	-
4	Forest resources rent provision	-	-	-	-	-	-	-	-	-	1.13	-	-
	TOTAL B2.3.	3	3	3	3	3	3	3	3	3	7	2	2
TOTAL COOPERATIVE EXPENSES		16	12	13	14	15	9	11	10	12	16	10	11
B3. Additional expenses		-	-	-	-	-	-	-	-	-	-	-	-
B3.1. Land rent		0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
B3.2. Transporting timber		-	-	-	-	-	-	-	-	-	6	-	-
	TOTAL B3	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	6	0.06	0.06
TOTAL COOPERATIVE EXPENSES (include land rent & transporting timber)		16	12	13	14	15	9	11	10	12	22	11	11

	Cash flow components	Year												
		13	14	15	16	17	18	19	20	21	22	23	24	25
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A. REVENUES														
A1. Wood														
1	Teak	-	-	41	-	-	-	-	92	-	-	-	-	760
	TOTAL A1	-	-	41	-	-	-	-	92	-	-	-	-	760
1	Paddy	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Corn	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Cassava	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Candle nuts	2	1.43	1.19	-	-	-	-	-	-	-	-	-	-
	TOTAL A2	16	16	14	13	11	10	8	6	-	-	-	-	-
A3. Salvage values from farming tools		18	17	15	13	11	10	8	6	-	-	-	-	-
2	Crowbar	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Cleaver	-	-	-	-	-	-	-	-	-	-	-	-	0.54
4	Ax	-	-	-	-	-	-	-	-	-	-	-	-	0.67
	TOTAL A3	-	-	-	-	-	-	-	-	-	-	-	-	2
TOTAL REVENUES		18	17	56	13	11	101	8	6	-	-	-	-	763
B. COST		-	-	-	-	-	-	-	-	-	-	-	-	-
B1. Government expenses		-	-	-	-	-	-	-	-	-	-	-	-	-
1	Intercropping	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Teak coppicing project	4	4	4	4	4	4	4	4	4	4	4	4	4
	TOTAL B1	4	4	4	4	4	4	4	4	4	4	4	4	4
B2. Cooperative members expenses		-	-	-	-	-	-	-	-	-	-	-	-	-
B2.1. Tools (Jointly used by timber & inter-crops)		-	-	-	-	-	-	-	-	-	-	-	-	-
1	Hoe	0.70	-	-	-	0.70	-	-	-	0.70	-	-	-	0.70
2	Crowbar	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95
3	Cleaver	0.97	-	-	-	0.97	-	-	-	0.97	-	-	-	0.97
4	Ax	0.73	-	-	0.73	-	-	0.73	-	-	0.73	-	-	0.73
	TOTAL B2.1.	3	-	-	2	2	-	2	-	2	2	-	-	3
B2.2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-	-	-
1	Seedlings	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Land preparation & fertilizers	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Labour	7	7	7	7	7	6	6	6	-	-	-	-	-
4	Harvesting for cashew and candle nuts	2	2	2	1.27	1.11	0.95	0.79	0.63	-	-	-	-	-
	TOTAL B2.2.	9	9	9	8	8	7	7	7	-	-	-	-	-
B2.3. Timber		-	-	-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance	2	2	2	2	2	2	2	1.31	1.31	1.31	1.31	1.31	-
2	Timber harvesting	-	-	6	-	-	-	-	12	-	-	-	-	103
3	Aquiring certifcate of validity of forest pr	-	-	4	-	-	-	-	5	-	-	-	-	32
4	Forest resources rent provision	-	-	3	-	-	-	-	4	-	-	-	-	26
	TOTAL B2.3.	2	2	15	2	2	2	2	24	1.31	1.31	1.31	1.31	160
TOTAL COOPERATIVE EXPENSES		14	11	23	11	11	9	10	30	3	3	-	-	-
B3. Additional expenses		-	-	-	-	-	-	-	-	-	-	-	-	-
B3.1. Land rent		0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
B3.2. Transporting timber		-	-	11	-	-	-	-	15	-	-	-	-	84
	TOTAL B3	0.06	0.06	11	0.06	0.06	0.06	0.06	15	0.06	0.06	0.06	0.06	84
TOTAL COOPERATIVE EXPENSES (include land rent & transporting timber)		14	11	34	11	11	9	10	45	3	3	0.06	0.06	84

Appendix Table 4-3.32. Cash flows of timber and inter-cropping crops in Nggelu Village (Bima District) (Rp 000,000/total studied area)

Cash flow components		Year											
		1	2	3	4	5	6	7	8	9	10	11	12
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
A. REVENUES													
A1. Wood													
1	Teak		-	-	-	-	1.43	-	-	-	-	69	-
	TOTAL A1		-	-	-	-	1.43	-	-	-	-	69	-
A2. Intercropping crops			-	-	-	-	-	-	-	-	-	-	-
1	Paddy		22	22	22	-	-	-	-	-	-	-	-
2	Corn		1.49	1.49	1.49	-	-	-	-	-	-	-	-
3	Soybean		8	8	8	-	-	-	-	-	-	-	-
4	Sesame		4	4	4	-	-	-	-	-	-	-	-
5	Cashew nuts		-	-	4	5	6	7	9	10	12	10	9
	TOTAL A2		36	36	40	5	6	7	9	10	12	10	9
A3. Salvage values from farming tools			-	-	-	-	-	-	-	-	-	-	-
1	Hoe		-	-	-	-	-	-	-	-	-	-	-
2	Crowbar		-	-	-	-	-	-	-	-	-	-	-
3	Cleaver		-	-	-	-	-	-	-	-	-	-	-
4	Ax		-	-	-	-	-	-	-	-	-	-	-
	TOTAL A3		-	-	-	-	-	-	-	-	-	-	-
TOTAL REVENUES			36	36	40	5	7	7	9	10	12	80	9
B. COST			-	-	-	-	-	-	-	-	-	-	-
B1. Government expenses			-	-	-	-	-	-	-	-	-	-	-
1	Investment costs		2	-	-	-	-	-	-	-	-	-	-
2	Operational costs		42	11	9	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
	TOTAL B1		44	11	9	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
	B2. Cooperative members expenses		-	-	-	-	-	-	-	-	-	-	-
B2.1. Tools (Jointly used by timber & inter-crops)			-	-	-	-	-	-	-	-	-	-	-
1	Hoe		0.72	-	-	0.72	-	-	0.72	-	-	0.72	-
2	Crowbar		1.23	-	-	1.23	-	-	1.23	-	-	1.23	-
3	Cleaver		2	-	-	2	-	-	2	-	-	2	-
4	Ax		1.13	-	-	1.13	-	-	1.13	-	-	1.13	-
	TOTAL B2.1.		5	-	-	5	-	- -	5	-	-	5	-
B2.2. Intercropping crops			-	-	-	-	-	-	-	-	-	-	-
1	Seedlings		12	12	12	12	12	-	-	-	-	-	-
2	Land preparation and fertilisers		5	5	5	5	5	-	-	-	-	-	-
3	Labour		14	14	14	14	14	15	15	15	15	15	15
4	Harvesting for cashew and candle nuts		-	-	0.41	0.50	0.60	0.72	0.86	1.03	1.24	1.03	0.86
	TOTAL B2.2.		31	31	32	32	32	15	16	16	16	16	16
B2.3. Timber			-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance		7	7	7	7	7	7	7	7	7	6	6
2	Timber harvesting		-	-	-	-	0.19	-	-	-	-	9	-
3	Aquiring certifcate of validity of forest products		-	-	-	-	3	-	-	-	-	17	-
4	Forest resources rent provision		-	-	-	-	1.41	-	-	-	-	9	-
	TOTAL B2.3.		7	7	7	7	11	7	7	7	7	41	6
TOTAL COOPERATIVE EXPENSES			43	38	39	44	43	22	28	23	23	61	21
B3. Additional expenses			-	-	-	-	-	-	-	-	-	-	-
B3.1. Land rent			0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
B3.2. Transporting timber			-	-	-	-	7	-	-	-	-	44	-
	TOTAL B3		0.18	0.18	0.18	0.18	7	0.18	0.18	0.18	0.18	45	0.18
TOTAL COOPERATIVE EXPENSES (include land rent & transporting timber)			43	38	39	44	51	23	28	23	24	106	21

Cash flow components		Year													
		13	14	15	16	17	18	19	20	21	22	23	24	25	25
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2023
A. REVENUES															
A1. Wood															
1	Teak	-	-	-	317	-	-	-	-	714	-	-	-	-	5,922
	TOTAL A1	-	-	-	317	-	-	-	-	714	-	-	-	-	5,922
A2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Paddy	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Corn	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Soybean	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Sesame	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Cashew nuts	7	6	5	4	-	-	-	-	-	-	-	-	-	-
	TOTAL A2	7	6	5	4	-	-	-	-	-	-	-	-	-	-
A3. Salvage values from farming tools		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Hoe	-	-	-	-	-	-	-	-	-	-	-	-	-	0.48
2	Crowbar	-	-	-	-	-	-	-	-	-	-	-	-	-	0.82
3	Cleaver	-	-	-	-	-	-	-	-	-	-	-	-	-	1.22
4	Ax	-	-	-	-	-	-	-	-	-	-	-	-	-	0.75
	TOTAL A3	-	-	-	-	-	-	-	-	-	-	-	-	-	3
TOTAL REVENUES		7	6	5	322	-	-	-	-	714	-	-	-	-	5,926
B. COST		-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1. Government expenses		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Investment costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Operational costs	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
	TOTAL B1	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
	B2. Cooperative members expenses	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2.1. Tools (Jointly used by timber & inter-crops)		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Hoe	-	0.72	-	-	0.72	-	-	0.72	-	-	0.72	-	-	0.72
2	Crowbar	-	1.23	-	-	1.23	-	-	1.23	-	-	1.23	-	-	1.23
3	Cleaver	-	2	-	-	2	-	-	2	-	-	2	-	-	2
4	Ax	-	1.13	-	-	1.13	-	-	1.13	-	-	1.13	-	-	1.13
	TOTAL B2.1.	-	5	-	-	5	-	-	5	-	-	5	-	-	5
B2.2. Intercropping crops		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Seedlings	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Land preparation and fertilisers	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Labour	15	14	14	14	-	-	-	-	-	-	-	-	-	-
4	Harvesting for cashew and candle nuts	0.72	0.60	0.50	0.41	-	-	-	-	-	-	-	-	-	-
	TOTAL B2.2.	15	15	15	15	-	-	-	-	-	-	-	-	-	-
B2.3. Timber		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Labor on timber maintenance	6	6	6	5	5	5	5	5	4	4	4	4	4	-
2	Timber harvesting	-	-	-	43	-	-	-	-	97	-	-	-	-	804
3	Aquiring certifcate of validity of forest products	-	-	-	32	-	-	-	-	43	-	-	-	-	246
4	Forest resources rent provision	-	-	-	26	-	-	-	-	35	-	-	-	-	200
	TOTAL B2.3.	6	6	6	105	5	5	5	5	178	4	4	4	4	1,250
TOTAL COOPERATIVE EXPENSES		21	26	21	120	9	5	5	9	178	4	9	4	4	1,255
B3. Additional expenses		-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3.1. Land rent		0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
B3.2. Transporting timber		-	-	-	85	-	-	-	-	114	-	-	-	-	656
	TOTAL B3	0.18	0.18	0.18	85	0.18	0.18	0.18	0.18	114	0.18	0.18	0.18	0.18	656
TOTAL COOPERATIVE EXPENSES (include land rent & transporting timber)		21	26	21	205	10	5	5	10	292	4	9	4	4	1,910

Appendix 4-4. Sensitivity analysis for Sumbawa case

Appendix Table 4-4. 1. Assessment criteria following sensitivity analysis based on different inflation rates in defining discount rates

Assessment criteria	Scenarios with different inflation rates					
	Modest scenario: 9%			Best scenario: 2%		
	Lamenta	Semamung	Average	Lamenta	Semamung	Average
1. Timber and intercropping						
a. NPV value						
a.1. Rp million	8,730	1,428	5,079	(5,095)	(584)	(2,839)
a.2. AUD	1,035,357	169,363	602,360	(604,198)	(69,239)	(336,719)
b. NPV value per ha						
b.1. Rp million	17	28	23	(10)	(12)	(11)
b.2. AUD	2,034	3,348	2,691	(1,187)	(1,369)	(1,278)
c. IRR (%)	7%	8%	8%	8%	8%	8%
d. NBIR	1	1	1	2	2	2
e. Return to labour	16	7	12	9	4	6
f. Return to land	1.2	2	2	0.7	1	1
2. Timber						
a. NPV value						
a.1. Rp million	875	1,258	1,066	(9,337)	(677)	(5,007)
a.2. AUD	103,788	149,150	126,469	(1,107,369)	(80,322)	(593,845)
b. NPV value per ha						
b.1. Rp million	2	76	39	(20)	(41)	(31)
b.2. AUD	226	9,026	4,626	(2,413)	(4,861)	(3,637)
c. IRR (%)	5%	8%	6%	5%	8%	6%
d. NBIR	1	2	1	0.3	1	0
e. Return to labour	14	2	8	7	1	4
f. Return to land	1	0.2	1	0.5	0.4	0.5

File: Disc rate 2% CF Lamenta - Dis rate inflation summary

Sources: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2005-2007)

Appendix Table 4-4.2. Assessment criteria following sensitivity analysis based on three levels of wood price increase

Assessment criteria	Scenarios with timber price increase								
	3% increases			5.5% increases			10% increases		
	Lamenta	Semamung	Average	Lamenta	Semamung	Average	Lamenta	Semamung	Average
1. Timber and intercropping									
a. NPV value									
a.1. Rp million	(635)	131	(252)	(434)	186	(124)	66	286	176
a.2. AUD	(75,269)	15,567	(29,851)	(51,513)	22,113	(14,700)	7,875	33,897	20,886
b. NPV value per ha									
b.1. Rp million	(1)	3	1	(1)	4	1	0	6	3
b.2. AUD	(148)	308	80	(101)	437	168	15	670	343
c. IRR (%)	8%	9%	8%	8%	9%	8%	8%	9%	9%
d. NBIR	1.0	0.9	1	1.0	2.2	2	1.0	0.8	1
e. Return to labour	12.0	5.4	9	12.2	5.5	9	12.5	5.7	9
f. Return to land	0.9	1.8	1	1.0	1.9	1	1.0	1.9	1
2. Timber									
a. NPV value									
a.1. Rp million	(6,250)	8	(3,121)	(6,049)	63	(2,993)	(5,549)	162	(2,693)
a.2. AUD	(741,185)	936	(370,124)	(717,430)	7,483	(354,973)	(658,042)	19,267	(319,387)
b. NPV value per ha									
b.1. Rp million	(13.62)	0	(7)	(13)	4	(5)	(12)	10	(1)
b.2. AUD	(1,615)	57	(779)	(1,563)	453	(555)	(1,434)	1,166	(134)
c. IRR (%)	5%	8%	6%	5%	8%	7%	5%	9%	7%
d. NBIR	0.5	1.0	1	0.6	1.0	1	0.6	1.1	1
e. Return to labour	9.2	1.8	6	9.3	1.9	6	9.7	1.9	6
f. Return to land	0.7	0.3	1	0.7	0.4	1	0.7	0.4	1

File: Timber price 3% CF Lamenta - Summary all sens an timb prices

( ): Negative value

Sources: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2005-2007)

Appendix 4-5. Sensitivity analysis for Bima case

Appendix Table 4-5. 1. Assessment criteria following sensitivity analysis based on different inflation rates in defining discount rates

Assessment criteria	Two scenarios of inflation rate					
	Modest scenario: 9%			Best scenario: 2%		
	Nggelu	Ntori	Average	Nggelu	Ntori	Average
1. Timber and intercropping						
a. NPV value						
a.1. Rp million	833	718	776	2,749	250	1,500
a.2. AUD	98,764	85,199	91,981	326,063	29,630	177,846
b. NPV value per ha						
b.1. Rp million	42	103	72	137	36	87
b.2. AUD	4,938	12,171	8,555	16,303	4,233	10,268
c. IRR (%)	98%	80%	89%	98%	80%	89%
d. NBIR	0.1	0.2	0.1	0.02	0.4	0.2
e. Return to labour	6	8	7	11	7	9
f. Return to land	2	3	3	4	3	3
2. Timber						
a. NPV value						
a.1. Rp million	186	11	98	1,599	(117)	741
a.2. AUD	22,015	1,310	11,662	189,681	(13,928)	87,877
b. NPV value per ha						
b.1. Rp million	27	4	16	234	(42)	96
b.2. AUD	3,223	471	1,847	27,771	(5,007)	11,382
c. IRR (%)	18%	4%	11%	18%	4%	11%
d. NBIR	4	1	3	26	0.1	13
e. Return to labour	10	9	9	31	3	17
f. Return to land	0.1	0.3	0.2	0.4	0.1	0.2

File: Inflation rates 2% Nggelu.xls - Disc rate inflation summary

Sources: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2005-2007)

Appendix Table 4-5.2. Assessment criteria following sensitivity analysis based on three levels of wood price increase

Assessment criteria	Scenarios with timber price increase								
	3% increases			5.5% increases			10% increases		
	Nggelu	Ntori	Average	Nggelu	Ntori	Average	Nggelu	Ntori	Average
1. Timber and intercropping									
a. NPV value									
a.1. Rp million	1,472	403	937	1,537	412	974	1,662	428	1,045
a.2. AUD	174,532	47,829	111,180	182,266	48,843	115,555	197,102	50,788	123,945
b. NPV value per ha									
b.1. Rp million	74	58	66	77	59	68	83	61	72
b.2. AUD	8,727	6,833	7,780	9,113	6,978	8,045	9,855	7,255	8,555
c. IRR (%)	104%	75%	89%	104%	75%	89%	104%	75%	90%
d. NBIR	0.04	0.28	0.16	0.04	0.28	0.16	0.04	0.27	0.15
e. Return to labour	8.13	6.89	7.51	8.36	6.97	7.67	8.80	7.13	7.97
f. Return to land	3.08	2.74	2.91	3.17	2.77	2.97	3.34	2.84	3.09
2. Timber									
a. NPV value									
a.1. Rp million	579	(66)	257	645	(58)	293	770	(42)	364
a.2. AUD	68,714	(7,828)	30,443	76,449	(6,836)	34,806	91,285	(4,933)	43,176
b. NPV value per ha									
b.1. Rp million	57	(55)	1	63	(48)	7	75	(35)	20
b.2. AUD	6,707	(6,528)	89	7,462	(5,701)	880	8,910	(4,114)	2,398
c. IRR (%)	17%	5%	11%	17%	6%	11%	18%	6%	12%
d. NBIR	10.58	0.56	5.57	11.66	0.61	6.14	13.73	0.72	7.23
e. Return to labour	12.03	12.12	12.07	12.69	12.78	12.74	13.96	14.06	14.01
f. Return to land	0.15	0.48	0.32	0.16	0.51	0.34	0.18	0.56	0.37

Sources: Analysed from data collected by CIFOR and WWF Indonesia Nusa Tenggara (2005-2007)

Appendix 5-1. Company profile: a case study of WKS (Wirakarya Sakti)

WKS is a national private company that operates nationally. It holds a concession for HTI under MoF Decree No. 744/Kpts-II/1996 dated November 25, 1996, initially for 78,240 ha (TUV International Indonesia, 2008). By 2004, the company had received addendum decree No. 346/Menhut-II/2004 (add. III), so the total area then became 293,812 ha in Jambi province, with a feasible planting area of 202,582 ha (TUV International Indonesia, 2008). The concession areas are distributed over four districts (Tanjung Jabung Barat, Tanjung Jabung Timur, BatangHari and Muara Jambi). The timber produced supplies the Lontar Papyrus Pulp and Paper Industry (LPPPI), which is located in the same province, Jambi. Both companies (Wirakarya Sakti and Lontar Papyrus) are subsidiaries of Asia Pulp and Paper, which operates under the Sinar Mas Group. The capacity of the factory is about 3.1 million tons of pulp per year. An estimated 4.7 cubic metres of wood are required to produce one ton of pulp, therefore, the factory needs about 18.38 million m^3 of acacia logs per year to operate at full capacity or about 122,000 ha per year if the productivity is assumed to be 150 m^3/ha (Nawir *et al.*, 2003b; Anonymous, 2009a). The company claimed that its planted areas had reached 293,812 ha by July 2009 or an estimated 58,762 ha per year with the standard rotation of 5 years (Anonymous, 2009a).

The company reported in 1999/2000 that 40% of the total concession area (101,716 ha) could not be planted since the community members claimed these areas under their ownership status. After a delineation process by the company which was reported to the MoF, the potential area available for partnership schemes was 82,368 ha or 33% of the total concession (Nawir *et al.*, 2003b). Therefore, the company decided to initiate a partnership scheme with the local communities who claimed these lands as a way to resolve the conflicts, and so acacia could be planted. By 2007, it was estimated that the total partnership planted areas amounted to 4,408 ha and involved 2,818 households (Nawir and ComForLink, 2007). WKS is among the few companies that have initiated partnerships and have taken into account the communities' involvement in resolving conflicts. However, the progress of developing *HTPK* has been very limited, since the negotiations between company and community are very protracted, resulting in high transaction costs.

At the same time, the company also proposed to the MoF to exclude these areas from their allocated concession areas and swap them for other areas as framed by the MoF Decree No SK. 48/Menhut-II/2004. In 2009, the area claimed totalled 55,371 ha (Andria, 2009). The area claimed by individual local villagers and community groups accounted for 98% of this (54,238 ha), and migrants ownership and areas overlapping with other companies contributed about 2% (1,133 ha) (Andria, 2009).

The company has become the principal destination for cross-visits from other companies or community groups from other provinces to learn more about the approach used by the company in implementing the partnership scheme. In 2008, the company received a Sustainable Forest Management Certification under the LEI 5000-2 standard for sustainable forest plantation management, with Bronze grade, for a total of 246,482 ha (TUV International Indonesia, 2008). The SFM Certificate is valid for 5 years, from 9 September 2008 until 8 September 2013 (TUV International Indonesia, 2008). For counter-perspectives regarding the operational activities and certification received by WKS, including the earlier certification granted by EU Ecolabel in 2006, for example, see Noor and Syumanda (2006) and Lang (2010).

Appendix 5-2. Company profile: Finnantara Intiga (FI)

The company received its Timber Plantation Concession Rights under a Ministerial Decree in 1996 through the MOF Decree (SK HPHTI No. 750/Kpts-II/1996). The land was mostly *Imperata* grasslands in logged-over areas formerly held by the state-owned company, Inhutani III (Nawir *et al.*, 2003b; FI, 2008). Most of the forest cover had been lost before the company entered the area (Miettinnen and Lammi, 2002). Since its establishment in 1996, the company has undergone several major changes in its management portfolio. These internal management changes have affected the effectiveness of the implementation of the partnership program. In the beginning, the shares were divided into 30% held by Stora Enso (through its subsidiary Nordic Forest Development Holding-NFDH), 40% held by the state-owned company, Inhutani III, with the remainder being held by *Gudang Garam* (a private cigarette company)(Nawir *et al.*, 2003b). No significant progress was recorded for the programmes during the absence of Nordic Company from Indonesia for two years (1998-1999) when the company had to leave the country as a result of the political situation in Indonesia (Nawir *et al.*, 2003b).

In 2000, NFDH took over the *Gudang Garam* shares and became the major shareholder with 67%; the remainder was held by Inhutani with 33% of shares. Following this change, Inhutani gradually also reduced its share in terms of financial contribution due to internal financial problems since they no longer received an allocation from the Reforestation Fund provided by the MoF (Nawir *et al.*, 2003b). The latest change was in 2004, when Stora Enso, as the major shareholder, sold the company to Global Forest-GF (Sinar Mas Forestry-SFM). This is the company group that also owns WKS Company in Jambi (as discussed in Section 5.3.1).

Besides taking over the problem of holding concession areas claimed by the local community that could not be developed, SMF inherited the partnership scheme as the main strategy for developing acacia timber plantations. However, as the new owner of the company since 2004, SFM planned to optimise its concession areas for developing timber plantations intensively. Currently FI manages a total concession area of 388,000 hectares (Schneck, 2008; FI, 2008). An additional 89,000 hectares was added to the 299,700 hectares of the initial concession area setup under the MoF Decree following the governor's recommendation (Schneck, 2008; FI, 2008). The concession areas are located in two districts of West Kalimantan, Sanggau/Sekadau (200,474 hectares) and Sintang (99,226 hectares)(FI, 2008). In both districts, a total of approximately 60,000 people in 110 villages live within the company's concession area (Miettinnen and Lammi, 2002). In early 2000, about 80,056 hectares (27%) of the total concession area could not be utilised because they overlapped areas used for oil palm plantations, residences, some areas with particularly high population density, and primary forest areas (Nawir *et al.*, 2003b). Another study reported that in 2008, the area that could not be planted had accumulated to 160,403 hectares. This included a conservation area, infrastructure, local tree species and customary forest (*Tembawang)*, rubber trees, a disputed area and occupied farmland (Schneck, 2009).

Appendix 5-3. The basis for CBA analysis community-company partnership schemes implemented by WKS in Jambi and FI in Sanggau

The CBA of the partnership scheme is based on the most recent arrangements that were implemented when the fieldwork was conducted; however, it also takes into account changes in the arrangements since the schemes were initiated. The analysis focuses on two levels of benefits reflecting the feasibility and profitability of the community-company partnership schemes discussed in Section 5.5 of Chapter 5: first, the overall benefits of the partnership scheme as currently designed; and second, the benefits received at the household level by community partners.

Under the partnership scheme arrangements, the company bears all of the initiation and implementation costs up to harvesting and transporting the timber to the mill (the case of WKS) and to the port (the case of FI). However, the analysis of the partnership scheme in this thesis is based on the understanding that community and company are both managers (Nawir *et al.*, 2003b). Therefore, costs contributed by community partners are, as much as possible, included in the analysis.

1. The analysis of feasibility and profitability for the overall partnership scheme

1a. Partnership management arrangements

The partnership arrangements define the management characteristics and are used as the basis for conducting the feasibility and profitability analysis of the CBA, as compiled in the table Appendix 5-3.1. The CBA analysis is conducted based on two scenarios: the partnership contract for a period of up to 30 years for WKS Scheme and 39 years for the FI Scheme, and acacia rotation as decided by the company (7 years in FI, 5 years in WKS). The unit analysis is based on the average size of one block managed as an acacia plantation under the partnership schemes. Within this scheme, the areas belonging to the community partners are scattered, so these areas have to be clustered as much as possible as one block to be managed efficiently as acacia plantations.

Appendix Table 5-3.1. Management characteristics under partnership schemes of FI and WKS

Partnership scheme management characteristics	Community-company partnership schemes	
	FI	WKS
1. Total period of partnership contract (years)[a]	39	30
2. One rotation (years)	7	5
3. Company timber productivity standard (m^3/ha)[b]	150	150
4. Current timber productivity	106	107
5. Unit analysis of block of areas (ha)[d]	250	229

Notes:

a. For FI, total period is estimated based on the remaining partnership contract period since it was initiated in 1996; currently, the company is shifting to implement one rotation-based partnership contracts. For WKS, total period is based on the current arrangement, to cover 6 rotations.

b. Standard used by the companies in their planning.

c. Estimated based on the total volume harvested as informed by community respondents and harvesting contractors during the survey.

d. In FI the block of areas is based on one sub-village (*kampong*) management as the unit used by the company in their planning; and in WKS, the block of areas is based on the average of the current partnership block managed by community partners.

1b. Revenue components

1b1. Timber: revenues from timber (acacia) were calculated from the harvested volume at the end of a rotation following silvicultural practices implemented by each company (see table Appendix 5:3-2). No revenues were calculated from thinning. The analysis was also conducted for two timber productivity levels: the current level of productivity for acacia plantations developed under the partnership scheme (106 m^3/ha for FI and 107 m^3/ha for WKS), which is lower than the company standard of acacia productivity of 150 m^3/ha in both cases. Two levels of productivity analysis following Nawir *et al.* (2003) and Schneck (2009), and timber volumes included in the final calculation took into account a 10% loss during the logging process and a 15% loss during transportation (Jurgens *et al.*, 2005; Jurgens, 2008; Schneck, 2009). The acacia timber price used was at USD 20 (2009).

1b2. Other revenues: under the FI partnership scheme, the community can derive additional revenue from rubber plantations following one of the incentives packages (see Section 5.3.3 for further description on incentives packages).

Appendix Table 5-3. 2. Silvicultural practices under partnership schemes of FI and WKS

Silvicultural practices	Community-company partnership schemes	
	FI	WKS
1. Types of timber	Acacia (*Acacia mangium*)	
2. One rotation (years)	7	5
3. Company timber productivity standard (m^3/ha)	150	150
4. Current timber productivity (m^3/ha)	106	107
5. Planting distances	(3 x 2) m	(3 x 2.5) m
6. Number of standing stock (trees)	1,667	1,333
7. Other silvicultural practices [a]	Maintenance for the first two years (e.g. weeding and fertilising)	

Notes:

a. There was some variation in implementing the silvicultural practices for partnership scheme areas; however, for the purpose of this analysis, the standard silvicultural practices used as part of appropriate timber plantation development were used as the basis for the analysis.

Sources: Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009).

1c. Company cost components

As described in table Appendix 5-3.3 below, company cost components include: investment, plantation development, timber harvesting and transporting, allocation for initiating partnership, and indirect overhead costs. The data on costs were collected from different sources, mainly the survey conducted during fieldwork from 4 to 21 January 2009 in Jambi (WKS areas) and Sanggau (FI areas). Other sources included company staff, contractors and secondary sources, such as Nawir *et al.* (2003b), ComForLink (2005), Jurgens (2005; 2008), Pokja Pemberdayaan Masyarakat (2006), and Schneck (2008).

Appendix Table 5-3.3. Cost components borne by the company

Cost component	Discounted cost per hectare based on partnership period			
	FI		WKS	
	Total period contract: 39	One rotation:	Total period contract: 30	One rotation:
1. Investment	7,900,593	3,807,407	6,600,643	916,756
2. Plantation development				
2.1. Land preparation planting	4,159,893	2,004,711	11,161,742	3,210,309
2.2. Maintenance	1,019,370	491,249	3,140,621	965,407
3. Timber harvesting and transporting				
3.1. Administration	515,795	219,237	1,135,441	416,860
3.2. Harvesting	71,653	36,009	55,461	21,882
3.3. Local transporting and operations at log ponds	2,237,065	950,859	105,744	38,822
4. Initiating partnership				
a. Royalty payments	20,188	875	16,883,210	4,488,432
b. Incentives package	1,134,956	570,370	-	
5. Indirect overhead costs	15,579,528	7,509,472	2,963,616	901,662

File: Appendix 5-1 Cost per ha.xls-WKS (3)

Description of cost components:

1c1. Investment costs include infrastructure, office buildings and machinery

1c2. Plantation development costs include land preparation, and planting, and maintenance activities, such as weeding and fertilising

1c3. Labour costs were estimated based on the allocation as described below.

Appendix Table 5-3.4. Labour required

Activities	Year	Labour required (person day/ha)
1. Land preparation	1	9
2. Planting	1	10
3. Fertilising	1	1
4. Maintenance 1 (weeding, pruning, slashing)	1	2
5. Maintenance 2 (weeding, pruning, slashing)	2	16
6. Timber harvesting and transporting (to port)	5-7	29
Total		67

Source: Adopted from Pirard, R. and Mayer, J. (2009).

1c4. Harvesting costs of timber include logging, administration costs to obtain the permits for harvesting and transportation costs, as well as to pay the forest resources provision fees (*PSDH-Provisi Sumber Daya Hutan*). The provision fees applied to acacia are defined by the MoF's regulation at 10% of total harvesting volume (GoI, 1999; Greenomics, 2004a).

1c5. Transportation cost refers to local transport to the mill (in the case of WKS) and to the port (in the case of FI); these also include the operational activities in handling the wood at log ponds (see Table Appendix 5-3. 4 on standard unit of transportation costs). Due to the scattered locations of land owned by community partners, a sensitivity analysis was conducted to analyse the feasibility of the partnership scheme at distances of more than 50 km (see Section d on the assumptions of external factors influencing the feasibility analysis).

1c4. Initiating partnership costs include royalty payments after harvesting at the end of a rotation and incentive packages. Incentive packages only apply under the FI Scheme (see Section 5.4 in Chapter 5).

1c5. Indirect overhead costs include costs allocated to negotiation processes, conflict resolution as part of the institutional arrangements setting up the partnership with the community, and forest protection, such as securing the plantations and often by providing incentives, such as to heads of sub-villages/villages/sub-districts.

1d. External factors as the basis for sensitivity analysis

There are two most important external factors affecting the feasibility and profitability of the partnership scheme management, so the analysis was conducted taking into account these two factors: transportation costs that vary according to the distance from the mill of the scattered locations of community partners' land (results are discussed in Section 5.5.1.1.2); and the rising price for acacia referring to the FoB (freight on board) price in US Dollars (results are discussed in Section 5.5.1.1.3).

1d1. Distance from processing mill/port defines the transportation costs

Taking into account that the distance from the mill has become an important external factor due to the scattered location of community partners' lands, and further analysis of the feasibility and profitability according to distance affecting timber transportation costs is included in Section 5.5.1.1.2 for full analysis. Thus, the analysis was conducted taking into account transportation costs that vary according to the distance from the mill of the community partners' scattered plots.

Appendix Table 5-3. 4. Standard unit of transportation costs (Rp/km)

Distances	FI	WKS
0-50 km	14,113	42,020
50-100	33;321	111,340
More than 100 km	44,459	181,040

Sources: Field work in Jambi and Sanggau (14-21 January, 2009).

1d2. Increasing prices of acacia

The rising price for acacia is the FoB price in USD. The increase in acacia prices reflects an increasing demand in Indonesia for timber from plantations, due to the scarcity of supply from natural forests (Pirard and Cossalter, 2006; Jurgens, 2008). Two levels of acacia prices were used, USD 36 and USD 46 following Jurgens *et al.* (2005); Pirard and Cossalter (2005); and Jurgens (2008). The FoB price in USD is the standard price used by most *HTI* companies in Indonesia in their planning and financial calculations (Pokja Pemberdayaan Masyarakat, 2006).

2. Analysing the shared benefits received at the household level of the community partners

2a. Revenue from timber

Revenue from timber to community partners is defined based on royalty payments and the benefit-sharing agreement, as decided in the partnership contractual agreement (discussed in Section 5.3.2 for WKS and Section 5.4.2 for FI).

2b. Other revenue as part of the partnership schemes

2b1. The incentives package includes: land incentives, funds for infrastructure development, and incentives for conducting a traditional ceremony prior to land clearing (see Table 5-5 for detailed description). Estimation of the total benefits at household level is included in Table 5-15, as discussed in Section 5.5.4.

2b2. Under the FI partnership scheme, other revenue comes to community partners from rubber plantations according to the incentives package provided by the company and implemented under the FI scheme. Revenues from rubber cultivation are based on an analysis of Sanggau adapted from Wulan *et al.* (2005), with additional analysis, the results of which are described in Table 5-18 (Section 5.5.4) based on:

- 2b2.1. Rotation for jungle rubber is 40 years because of the use of local species; production is started at year 11 and can be harvested up to year 40 (see table below)
- 2b2.2. Local practices use the level of productivity for oil palm fruits from the survey during the field work in Jambi (2009), which is 153.22 kg/ha/year
- 2b2.3. Analysis using low price refers to the level of prices during the global financial crisis while the survey was being conducted in 2009: Rp 5,374 (AUD 0.64)
- 2b2.4. Analysis using normal price refers to the level of prices before the global financial crisis in 2009: Rp 13,500 (AUD 1.60) per kg.

Appendix Table 5-3.5. Costs and revenues per ha for rubber plantations

Year	Planting materials:	Tools	Fertilizer and chemical: Acide Formique (600 ml)	Labour	Total costs	Rubber production: Thin Slab (51% DRC)
1	0	390,272	0	2,833,088	3,223,360	0
2	101,182	0	0	2,457,270	2,558,452	0
3	0	0	0	346,909	346,909	0
4	0	0	0	72,273	72,273	0
5	0	0	0	72,273	72,273	0
6	0	3,606,405	0	72,273	3,678,678	0
7	0	0	0	72,273	72,273	0
8	0	0	0	72,273	72,273	0
9	0	0	0	72,273	72,273	0
10	0	0	0	72,273	72,273	0
11	0	922,922	93,467	2,421,134	3,437,522	8,729,491
12	0	393,886	93,467	2,421,134	2,908,487	8,729,491
13	0	532,649	93,467	2,421,134	3,047,250	8,729,491
14	0	393,886	93,467	2,421,134	2,908,487	8,729,491
15	0	532,649	93,467	2,421,134	3,047,250	8,729,491
16	0	531,204	151,285	3,107,724	3,790,213	14,129,491
17	0	532,649	151,285	3,107,724	3,791,658	14,129,491
18	0	393,886	151,285	3,107,724	3,652,895	14,129,491
19	0	532,649	151,285	3,107,724	3,791,658	14,129,491
20	0	393,886	151,285	3,107,724	3,652,895	14,129,491
21	0	922,922	151,285	3,107,724	4,181,931	14,129,491
22	0	393,886	151,285	3,107,724	3,652,895	14,129,491
23	0	532,649	151,285	3,107,724	3,791,658	14,129,491
24	0	393,886	151,285	3,107,724	3,652,895	14,129,491
25	0	532,649	151,285	3,107,724	3,791,658	14,129,491
26	0	531,204	151,285	3,107,724	3,790,213	14,129,491
27	0	532,649	119,485	2,421,134	3,073,268	11,159,491
28	0	393,886	119,485	2,421,134	2,934,505	11,159,491
29	0	532,649	119,485	2,421,134	3,073,268	11,159,491
30	0	393,886	119,485	2,421,134	2,934,505	11,159,491
31	0	922,922	0	2,421,134	3,344,055	7,649,491
32	0	393,886	0	2,421,134	2,815,020	7,649,491
33	0	532,649	0	2,421,134	2,953,783	7,649,491
34	0	393,886	0	2,421,134	2,815,020	7,649,491
35	0	532,649	0	2,421,134	2,953,783	7,649,491
36	0	531,204	0	2,421,134	2,952,338	7,649,491
37	0	532,649	0	2,421,134	2,953,783	7,649,491
38	0	393,886	0	2,421,134	2,815,020	7,649,491
39	0	532,649	0	2,421,134	2,953,783	7,649,491
40	0	393,886	0	2,421,134	2,815,020	7,649,491

Sources: Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009), and Wulan *et al.* (2005).

2c. Other alternative revenue is from the opportunity costs to community partners for land used for acacia plantations: the oil palm practice is based on the partnership scheme between local community and estate company implemented in the area of South Sumatra Province adjacent to the WKS partnership scheme area in Jambi (adapted from Sulistianawati (2010)), with the following conditions:

2c.1. Rotation of oil palm trees is 25 years, with production commencing at year 5 and continuing to year 25

2c.2. Productivity under high-yield practices is 17 ton/ha/year

2c.3. Local practices use the level of productivity for oil palm fruits from the survey during the fieldwork in Jambi (2009), which was 4.12 ton/ha/year

2c.4. The average normal price was Rp 1,535 (AUD 0.18) per kg and the average price during the crisis was Rp 461 (AUD 0.05).

Appendix Table 5-3.5. Estimated revenues and costs per ha for independent oil palm plantation smallholders

Year	Estimated yield (kg/ha)	Farm gate price (Rp/kg)	Total revenues (Rp/ha)	Costs (Rp/ha)			Net benefits (Rp/ha)
				Investment	Operating	Total	
0	0	0	0	9,121,603	0	9,121,603	(9,121,603)
1	0	0	0	1,781,952	0	1,781,952	(1,781,952)
2	0	0	0	2,834,924	0	2,834,924	(2,834,924)
3	0	0	0	2,205,633	0	2,205,633	(2,205,633)
4	800	1,472	1,177,584	0	647,983	647,983	529,601
5	1,800	1,558	2,803,771	0	710,289	710,289	2,093,483
6	2,800	1,662	4,654,260	0	772,595	772,595	3,881,666
7	3,400	1,765	6,000,071	0	841,131	841,131	5,158,939
8	3,600	1,869	6,729,051	0	915,899	915,899	5,813,153
9	3,800	1,974	7,501,646	0	1,003,127	1,003,127	6,498,519
10	3,800	2,099	7,975,172	0	1,096,586	1,096,586	6,878,586
11	3,800	2,222	8,442,467	0	1,196,276	1,196,276	7,246,191
12	3,800	2,348	8,922,223	0	1,314,657	1,314,657	7,607,566
13	3,800	2,492	9,470,517	0	1,439,269	1,439,269	8,031,247
14	3,600	2,638	9,495,439	0	1,520,267	1,520,267	7,975,172
15	3,600	2,804	10,093,577	0	1,613,726	1,613,726	8,479,851
16	3,400	2,971	10,099,807	0	1,713,416	1,713,416	8,386,392
17	3,200	3,137	10,037,501	0	1,813,105	1,813,105	8,224,396
18	3,000	3,344	10,031,271	0	1,925,256	1,925,256	8,106,014
19	3,000	3,531	10,592,025	0	2,037,407	2,037,407	8,554,618
20	3,000	3,738	11,215,085	0	2,162,019	2,162,019	9,053,066
21	2,800	3,968	11,109,165	0	2,292,862	2,292,862	8,816,303
22	2,800	4,217	11,806,993	0	2,429,935	2,429,935	9,377,057
23	2,800	4,466	12,504,820	0	2,573,239	2,573,239	9,931,581
24	2,600	4,735	12,311,671	0	2,729,004	2,729,004	9,582,667
25	2,600	5,006	13,015,730	0	2,891,000	2,891,000	10,124,730

Source: Analysed from Adiwinata, A. S. (1999)

Appendix Table 5-3.6. Estimated revenues and costs per ha for oil palm plantation developed by smallholders under the partnership scheme

Year	Production (ton/ha) [a]	Price (Rp/kg)	Revenues (Rp/ha)	Loans (Rp/ha)	Operational (Rp/ha)	Repayment (Rp)	Net benefits (Rp/ha)
0	0	1,101	0	1,540,385	5,452,417	0	(5,452,417)
1	0	1,142	0	3,138,492	1,418,249	0	(1,418,249)
2	0	1,183	0	4,267,847	1,663,088	0	(1,663,088)
3	0	1,224	0	5,523,319	2,150,548	0	(2,150,548)
4	4.18	1,264	5,283,520	6,799,848	1,762,000	621,825	2,899,695
5	8.18	1,304	10,666,720	7,198,000	2,092,200	1,184,008	7,390,512
6	4.18	1,343	5,613,740	6,013,993	2,343,220	1,316,164	1,954,356
7	6.18	1,381	8,534,580	4,697,828	2,661,335	1,570,566	4,302,679
8	4.18	1,419	5,931,420	3,127,263	2,227,384	1,869,646	1,834,390
9	8.18	1,456	11,910,080	1,257,616	2,686,331	1,257,616	7,966,133
10	6.18	1,492	9,220,560	-	3,096,689	0	6,123,871
11	6.18	1,528	9,443,040	-	3,562,255	0	5,880,785
12	6.18	1,562	9,653,160	-	4,068,532	0	5,584,628
13	5.18	1,595	8,262,100	-	4,616,862	0	3,645,238
14	5.18	1,627	8,427,860	-	5,165,006	0	3,262,854
15	5.18	1,658	8,588,440	-	5,729,058	0	2,859,382
16	3.18	1,688	5,367,840	-	6,249,657	0	(881,817)
17	3.18	1,716	5,456,880	-	6,782,562	0	(1,325,682)
18	3.18	1,743	5,542,740	-	7,321,577	0	(1,778,837)
19	3.18	1,769	5,625,420	-	7,942,341	0	(2,316,921)
20	3.18	1,794	5,704,920	-	8,614,043	0	(2,909,123)
21	3.18	1,817	5,778,060	-	9,205,875	0	(3,427,815)
22	3.18	1,838	5,844,840	-	9,978,198	0	(4,133,358)
23	3.18	1,859	5,911,620	-	10,649,836	0	(4,738,216)
24	3.18	1,878	5,972,040	-	11,535,420	0	(5,563,380)

Notes: a. The level of productivity for oil palm fruits was collected during the fieldwork in Jambi (2009).

Sources: Analysed from data collected during survey in Jambi (4-12 January, 2009) and Sanggau (13-21 January, 2009), and Sulistianawati (2010)

2d. Community cost components

The community's contribution to both schemes was estimated on the basis of the hours of labour allocated by the community, based on information obtained from the community partners. However, for the FI scheme, there are additional costs that the community has been allocating to the development of rubber plantations in response to the incentive package, which includes seedling assistance. Therefore, the community cost components include:

2d.1. Labour time: mainly hours allocated to supervision and fire prevention within acacia plantations

2d.2. Time allocated to meetings and negotiation among community partners as part of community group or cooperative activities, as well as between community partners and company field staff

2d.3. Costs of developing rubber plantations, including labour time allocated to manage rubber plantations, fertilisers, and tools and equipment

2d.4. Labour wage per person working day of Rp 26,000 (AUD 3) in Sanggau, and Rp 36,530 (AUD 4) in Jambi.

Appendix Table 5-3.5. Cash flows of timber managed under partnership scheme by FI in Sanggau, West Kalimantan (Rp 000,000/total case studied area)

	Cash flow components	Year															
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		First Rotation								Second Rotation							
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
A.	**Revenue components**																
A1.	Timber	-	-	-	-	-	-	-	7,566	-	-	-	-	-	-	-	7,566
A2.	High yielding rubber production	-	-	-	-	-	-	-	-	-	-	1,058	1,058	1,058	1,058	1,058	1,712
	Total revenues	-	-	-	-	-	-	-	7,566	-	-	1,058	1,058	1,058	1,058	1,058	9,277
B.	**Cost components**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1.	**Infrastructure and equipments**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Infrastructure maintenance	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
2	Amortication and depreciation	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
	Total infrastructure maintenance	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
B2.	**Company expenses for plantation development**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	**Plantation establishment**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1a. Land preparation	125	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-
	1b. Seedlings preparation	89	-	-	-	-	-	-	-	89	-	-	-	-	-	-	-
	1c. Planting (labour and fertiliser)	302	-	-	-	-	-	-	-	302	-	-	-	-	-	-	-
	1d. Enrichment planting	25	-	-	-	-	-	-	-	25	-	-	-	-	-	-	-
	Total plantation establishment	541	-	-	-	-	-	-	-	541	-	-	-	-	-	-	-
2	**Maintenance (weeding and fertilising)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2a. Maintenance 1	69	-	-	-	-	-	-	-	69	-	-	-	-	-	-	-
	2b. Maintenance 2	-	69	-	-	-	-	-	-	-	69	-	-	-	-	-	-
	Total plantation maintenance	69	69	-	-	-	-	-	-	69	69	-	-	-	-	-	-
3	**Harvesting**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3a. Harvesting and hauling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3a1. Harvesting and sorting	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	6
	3a2. Cutting and skidding	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	8
	3a3. Loading	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	3
	Total harvesting and hauling	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	17
	3b. Local transportation	-	-	-	-	-	-	-	2,955	-	-	-	-	-	-	-	2,955
	3c. Operational log pond	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3c1. Loading and transport between logpond	-	-	-	-	-	-	-	623	-	-	-	-	-	-	-	623
	3c2. Overhead costs (harvesting)	-	-	-	-	-	-	-	144	-	-	-	-	-	-	-	144
	Total transportation & overhead costs for	-	-	-	-	-	-	-	766	-	-	-	-	-	-	-	766
	Total harvesting and transporting	-	-	-	-	-	-	-	783	-	-	-	-	-	-	-	783
B3.	**Indirect overhead costs in relation to plantation**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Disctrict allocation	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
	Division allocation (including PSDH)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	PPN	-	-	-	-	-	-	-	27	-	-	-	-	-	-	-	27
	Total indirect overhead costs	69	69	69	69	69	69	69	96	69	69	69	69	69	69	69	96
B4.	**Company expenses on partnership schemes**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Royalty payments to community	-	-	-	-	-	-	-	0.38	-	-	-	-	-	-	-	0.38
2	Incentives packages	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2a. Land preparation	13	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-
	2b. Infrastructure incentives	13	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-
	2c. Land incentives	3	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
	2d. Rubber seedlings and maintenance	125	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-
	2e. Traditional ceremony	2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
	Total payments to the community partners	154	-	-	-	-	-	-	0.38	154	-	-	-	-	-	-	0.38
B4.	**Community expenses in partnership schemes**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Labour allocation for supervision/fires prevention	-	-	-	-	-	19	19	-	-	-	-	-	-	19	19	-
2	Meetings/negotiation	2	-	-	-	-	-	2	-	2	-	-	-	-	-	2	-
3	Managing rubber plantations	392	310	42	9	9	446	9	9	9	9	416	352	369	352	369	459
	Total community expenses	394	310	42	9	9	465	30	9	11	9	416	352	369	372	391	459

Cash flow components	Year																							
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	Third rotation								Fourth rotation								Fifth rotation							
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
A. Revenue components																								
A1. Timber	-	-	-	-	-	-	-	7,566	-	-	-	-	-	-	-	7,566	-	-	-	-	-	-	-	7,566
A2. High yielding rubber production	1,712	1,712	1,712	1,712	1,712	1,712	1,712	1,712	1,712	1,712	1,352	1,352	1,352	1,352	927	927	927	927	927	927	927	927	927	927
Total revenues	1,712	1,712	1,712	1,712	1,712	1,712	1,712	9,277	1,712	1,712	1,352	1,352	1,352	1,352	927	8,492	927	927	927	927	927	927	927	8,492
B. Cost components	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1. Infrastructure and equipments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Infrastructure maintenance	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
2 Amortication and depreciation	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Total infrastructure maintenance	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
B2. Company expenses for plantation development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Plantation establishment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1a. Land preparation	125	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-
1b. Seedlings preparation	89	-	-	-	-	-	-	-	89	-	-	-	-	-	-	-	89	-	-	-	-	-	-	-
1c. Planting (labour and fertiliser)	302	-	-	-	-	-	-	-	302	-	-	-	-	-	-	-	302	-	-	-	-	-	-	-
1d. Enrichment planting	25	-	-	-	-	-	-	-	25	-	-	-	-	-	-	-	25	-	-	-	-	-	-	-
Total plantation establishment	541	-	-	-	-	-	-	-	541	-	-	-	-	-	-	-	541	-	-	-	-	-	-	-
2 Maintenance (weeding and fertilising)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a. Maintenance 1	69	-	-	-	-	-	-	-	69	-	-	-	-	-	-	-	69	-	-	-	-	-	-	-
2b. Maintenance 2	-	69	-	-	-	-	-	-	-	69	-	-	-	-	-	-	-	69	-	-	-	-	-	-
Total plantation maintenance	69	69	-	-	-	-	-	-	69	69	-	-	-	-	-	-	69	69	-	-	-	-	-	-
3 Harvesting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a. Harvesting and hauling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a1. Harvesting and sorting susun	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-
3a2. Cutting and skidding	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-
3a3. Loading	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
Total harvesting and hauling	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-
3b. Local transportation	-	-	-	-	-	-	-	2,955	-	-	-	-	-	-	-	2,955	-	-	-	-	-	-	-	-
3c. Operational logpond	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c1. Loading and transport between logpond	-	-	-	-	-	-	-	623	-	-	-	-	-	-	-	623	-	-	-	-	-	-	-	623
3c2. Overhead costs (harvesting)	-	-	-	-	-	-	-	144	-	-	-	-	-	-	-	144	-	-	-	-	-	-	-	144
Total transportation & overhead costs	-	-	-	-	-	-	-	766	-	-	-	-	-	-	-	766	-	-	-	-	-	-	-	766
Total harvesting and transporting	-	-	-	-	-	-	-	783	-	-	-	-	-	-	-	783	-	-	-	-	-	-	-	766
B3. Indirect overhead costs in relation to plantation establishment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disctrict allocation	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Division allocation (including PSDH)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
PPN	-	-	-	-	-	-	-	27	-	-	-	-	-	-	-	27	-	-	-	-	-	-	-	27
Total indirect overhead costs	69	69	69	69	69	69	69	96	69	69	69	69	69	69	69	96	69	69	69	69	69	69	69	96
B4. Company expenses on partnership schemes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Royalty payments to community	-	-	-	-	-	-	-	0.38	-	-	-	-	-	-	-	0.38	-	-	-	-	-	-	-	0.38
2 Incentives packages	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a. Land preparation	13	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b. Infrastructure incentives	13	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2c. Land incentives	3	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2d. Rubber seedlings and maintenance	125	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2e. Traditional ceremony	2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total payments to the community partners	154	-	-	-	-	-	-	0.38	154	-	-	-	-	-	-	0.38	-	-	-	-	-	-	-	0.38
B4. Community expenses in partnership schemes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Labour allocation for supervision/fires prevention	-	-	-	-	-	19	19	-	-	-	-	-	-	19	19	-	-	-	-	-	-	19	19	-
2 Meetings/negotiation	2	-	-	-	-	-	2	-	2	-	-	-	-	-	2	-	2	-	-	-	-	-	2	-
3 Managing rubber plantations	459	443	459	443	507	443	459	443	459	459	372	356	372	356	405	341	358	341	358	358	358	341	358	341
Total community expenses	462	443	459	443	507	462	481	443	462	459	372	356	372	375	427	341	360	341	358	358	358	360	379	341

Appendix Table 5-3.6. Cash flows of timber managed under partnership scheme by WKS in Jambi, Sumatra (Rp 000,000/case studied area)

Cash flow components	Year																	
	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
	First Rotation						Second Rotation						Third Rotation					
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
A. Revenue components																		
A1. Timber	-	-	-	-	-	4,893	-	-	-	-	-	4,893	-	-	-	-	-	4,893
Total revenues	-	-	-	-	-	4,893	-	-	-	-	-	4,893	-	-	-	-	-	4,893
B. Cost components	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1. Infrastructure and equipments (maintenance, amortication & depreciation)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Infrastructure maintenance	346	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 Amortication and depreciation	1,286	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total infrastructure maintenance	1,632	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2. Company expenses in developing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Plantation establishment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1a. Land preparation	282	-	-	-	-	-	784	-	-	-	-	-	784	-	-	-	-	-
1b. Seedlings preparation	126	-	-	-	-	-	126	-	-	-	-	-	126	-	-	-	-	-
1c. Planting (labour and fertiliser)	386	-	-	-	-	-	371	-	-	-	-	-	371	-	-	-	-	-
1d. Enrichment planting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total plantation establishment	794	-	-	-	-	-	1,281	-	-	-	-	-	1,281	-	-	-	-	-
2 Maintenance (weeding and fertilising)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a. Maintenance 1	156	-	-	-	-	-	175	-	-	-	-	-	175	-	-	-	-	-
2b. Maintenance 2	-	89	-	-	-	-	-	190	-	-	-	-	-	190	-	-	-	-
Total plantation maintenance	156	89	-	-	-	-	175	190	-	-	-	-	175	190	-	-	-	-
3 Harvesting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a. Harvesting and hauling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a1. Harvesting and sorting	-	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	8
3a2. Cutting and skidding	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a.3. Loading	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total harvesting and hauling	-	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	8
3b. Local transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c. Operational log pond	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c1. Loading and transport between log	-	-	-	-	-	14	-	-	-	-	-	14	-	-	-	-	-	14
3c2. Overhead costs (harvesting)	-	-	-	-	-	151	-	-	-	-	-	151	-	-	-	-	-	151
Total transportation and overhead costs for transporting	-	-	-	-	-	166	-	-	-	-	-	166	-	-	-	-	-	166
Total harvesting and transporting	-	-	-	-	-	174	-	-	-	-	-	174	-	-	-	-	-	174
B3. Indirect overhead costs in relation to plantation establishment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Overhead developing plantations	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
2 Overhead partnership schemes (planning and survey)	1.17	-	-	-	-	-	1.17	-	-	-	-	-	1.17	-	-	-	-	-
3 Indirect overhead costs	218	-	-	-	-	-	327	-	-	-	-	-	327	-	-	-	-	-
Total indirect overhead costs	220	0.80	0.80	0.80	0.80	0.80	329	0.80	0.80	0.80	0.80	0.80	329	0.80	0.80	0.80	0.80	0.80
B4. Company expenses in initiating/implementing partnership schemes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Royalty payments for planted timber	-	-	-	-	-	1,631	-	-	-	-	-	2,072	-	-	-	-	-	2,512
Total payments to the community	-	-	-	-	-	1,631	-	-	-	-	-	2,072	-	-	-	-	-	2,512
B4. Community expenses in partnership schen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Labour allocation for supervision/fires	-	-	-	-	27	27	-	-	-	-	27	27	-	-	-	-	27	27
2 Meeting/negotiation within community group and with companies	4	-	-	-	-	4	4	-	-	-	-	4	4	-	-	-	-	4
Total community expenses	4	-	-	-	27	31	4	-	-	-	27	31	4	-	-	-	27	31

Cash flow components	Year																	
	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
	Fourth Rotation						Fifth Rotation						Six Rotation					
	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2033	2034	2035	2036	2037	2038
A. Revenue components																		
A1. Timber	-	-	-	-	-	4,893	-	-	-	-	-	4,893	-	-	-	-	-	4,893
Total revenues	-	-	-	-	-	4,893	-	-	-	-	-	4,893	-	-	-	-	-	4,893
B. Cost components	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1. Infrastructure and equipments (maintenance, amortication & depreciation)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Infrastructure maintenance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 Amortication and depreciation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total infrastructure maintenance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2. Company expenses in developing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Plantation establishment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1a. Land preparation	784	-	-	-	-	-	784	-	-	-	-	-	784	-	-	-	-	-
1b. Seedlings preparation	126	-	-	-	-	-	126	-	-	-	-	-	126	-	-	-	-	-
1c. Planting (labour and fertiliser)	371	-	-	-	-	-	371	-	-	-	-	-	371	-	-	-	-	-
1d. Enrichment planting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total plantation establishment	1,281	-	-	-	-	-	1,281	-	-	-	-	-	1,281	-	-	-	-	-
2 Maintenance (weeding and fertilising)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a. Maintenance 1	175	-	-	-	-	-	175	-	-	-	-	-	175	-	-	-	-	-
2b. Maintenance 2	-	190	-	-	-	-	-	190	-	-	-	-	-	190	-	-	-	-
Total plantation maintenance	175	190	-	-	-	-	175	190	-	-	-	-	175	190	-	-	-	-
3 Harvesting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a. Harvesting and hauling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a1. Harvesting and sorting	-	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	8
3a2. Cutting and skidding	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a.3. Loading	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total harvesting and hauling	-	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	8
3b. Local transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c. Operational log pond	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c1. Loading and transport between log	-	-	-	-	-	14	-	-	-	-	-	14	-	-	-	-	-	14
3c2. Overhead costs (harvesting)	-	-	-	-	-	151	-	-	-	-	-	151	-	-	-	-	-	151
Total transportation and overhead costs for transporting	-	-	-	-	-	166	-	-	-	-	-	166	-	-	-	-	-	166
Total harvesting and transporting	-	-	-	-	-	174	-	-	-	-	-	174	-	-	-	-	-	174
B3. Indirect overhead costs in relation to plantation establishment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Overhead developing plantations	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
2 Overhead partnership schemes (planning and survey)	1.17	-	-	-	-	-	1.17	-	-	-	-	-	1.17	-	-	-	-	-
3 Indirect overhead costs	327	-	-	-	-	-	327	-	-	-	-	-	327	-	-	-	-	-
Total indirect overhead costs	329	0.80	0.80	0.80	0.80	0.80	329	0.80	0.80	0.80	0.80	0.80	329	0.80	0.80	0.80	0.80	0.80
B4. Company expenses in initiating/implementing partnership schemes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Royalty payments for planted timber	-	-	-	-	-	2,953	-	-	-	-	-	3,394	-	-	-	-	-	3,834
Total payments to the community	-	-	-	-	-	2,953	-	-	-	-	-	3,394	-	-	-	-	-	3,834
B4. Community expenses in partnership schen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 Labour allocation for supervision/fires	-	-	-	-	27	27	-	-	-	-	27	27	-	-	-	-	27	27
2 Meeting/negotiation within community group and with companies	4	-	-	-	-	4	4	-	-	-	-	4	4	-	-	-	-	4
Total community expenses	4	-	-	-	27	31	4	-	-	-	27	31	4	-	-	-	27	31

Appendix 6-1. Problems arising in the development of oil palm plantations under the partnership scheme in Sanggau District

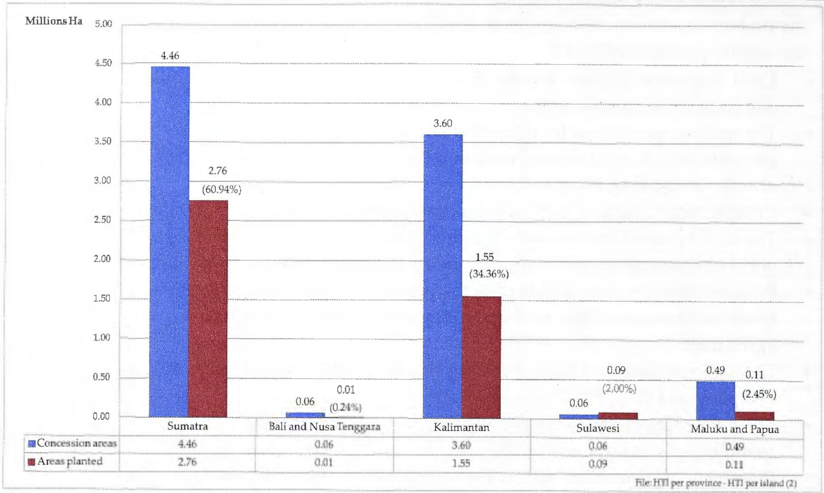
The partnership scheme was initiated in 1979; significant problems affecting community partners include [a]:

- Land acquisition process has not properly considered indigenous people's and local communities' rights
- The reallocation of land to individual households has been unfair, not transparent and not in accordance with the promises and agreements made or with the existing rules;
- Compensation for land has not been transparent and land is under-valued;
- The calculation of the amount of credit repaid by community partners has not been transparent and no participatory mechanism has been applied;
- Farmers have not been involved in the process of determining the price of fresh fruit bunches (FFB), so the set price was not based on collective agreement;
- Local people have not been given the chance to be employed in the nucleus company and the CPO processing plant;
- The connecting roads to the participating community members have not been properly maintained by the company and the government;
- Placement of plantations within the community partner areas is not in accordance with the submitted plan for the land;
- Social conflicts have frequently erupted between community and company, and community and the government, and between members of the community itself;
- Severe cases of environmental pollution of river water, soil and air from the processing factory have occurred as a result of waste and of the chemicals used;
- The company does not respect the local customary laws or adhere to the state laws.

After this petition, there has been some improvements, and price for FFB has been set more transparently involving co-operatives, Estate Crops District Agency, and company. However, there have valuable lessons learnt for implementing partnership scheme for tree-growing.

a. Source: cited from the Declaration of Union of Farmers of Oil Palm Plantations (Serikat Petani Kelapa Sawit - SPKS), Sanggau District, West Kalimantan, Indonesia, Wisma Tabor Pusat Damai, June 9, 2006 (http://www.forestpeoples.org/sites/fpp/files/publication/2010/08/declunionoilpalmfarmersjun06bahasa.pdf)

Appendix 7-1. Distribution of areas managed and planted under the *HTI* Programme across different islands in Indonesia



Provinces in Sumatra	Concession areas (millions Ha)	Areas planted (%)
Aceh	0.23	5.25%
North Sumatra	0.30	6.70%
West Sumatra	0.05	1.14%
Riau	1.67	37.51%
Riau Islands	0.00	0.00%
Jambi	0.60	13.52%
South Sumatra	1.38	30.87%
Bangka Belitung	0.00	0.00%
Bengkulu	0.07	1.52%
Lampung	0.16	3.49%
Total	4.46	100.00%

Provinces in Kalimantan	Concession areas (millions Ha)	Areas planted (%)
West Kalimantan	1.29	35.83%
Central Kalimantan	0.48	13.27%
South Kalimantan	0.46	12.70%
East Kalimantan	1.38	38.20%
Total	3.60	100.00%

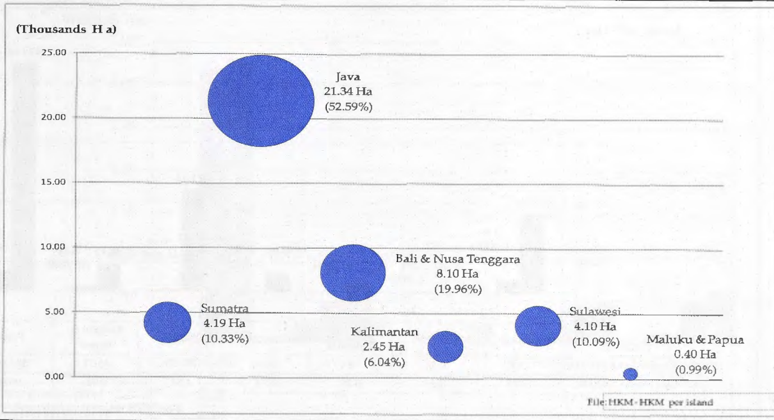
Provinces in Bali & Nusa Tenggara	Concession areas (millions Ha)	Areas planted (%)
Bali	0.00	0.00%
West Nusa Tenggara	0.06	100.00%
East Nusa Tenggara	0.00	0.00%
Total	0.06	100.00%

Provinces in Sulawesi	Concession areas (millions Ha)	Areas planted (%)
North Sulawesi & Gorontalo	0.01	11.87%
Central Sulawesi	0.01	21.20%
Southeast Sulawesi	0.00	0.00%
South Sulawesi	0.03	45.89%
West Sulawesi	0.01	21.04%
Total	0.06	100.00%

Provinces in Maluku & Papua	Concession areas (millions Ha)	Areas planted (%)
Maluku	0.07	14.76%
North Maluku	0.04	7.80%
Papua	0.38	77.44%
West Papua	0.00	0.00%
Total	0.49	100.00%

Sources: Adapted from MoF (2010d)

Appendix 7-2. Distribution of areas managed and planted under the *HKm* Programme across different islands in Indonesia



Provinces in Sumatra	Community forestry (Thousands Ha)	% of total
Aceh	0.00	0.00%
North Sumatra	0.19	4.53%
West Sumatra	0.20	4.77%
Riau	0.80	19.08%
Riau Islands	0.00	0.00%
Jambi	2.41	57.55%
South Sumatra	0.00	0.00%
Bangka Belitung	0.00	0.00%
Bengkulu	0.00	0.00%
Lampung	0.59	14.07%
Total	4.19	100.00%

Provinces in Java	Community forestry (Thousands Ha)	% of total
Banten	0.00	0.00%
Jakarta	0.00	0.00%
West Java	0.00	0.00%
Central Java	16.44	77.03%
Yogyakarta	4.73	22.15%
East Java	0.18	0.82%
Total	21.34	100.00%

Provinces in Bali & Nusa Tenggara	Community forestry (Thousands Ha)	% of total
Bali	0.05	0.62%
West Nusa	0.76	9.36%
East Nusa Tenggara	7.29	90.02%
Total	8.10	100.00%

Provinces in Kalimantan	Community forestry (Thousands Ha)	% of total
West Kalimantan	0.20	8.16%
Central Kalimantan	0.30	12.24%
South Kalimantan	1.95	79.59%
East Kalimantan	0.00	0.00%
Total	2.45	100.00%

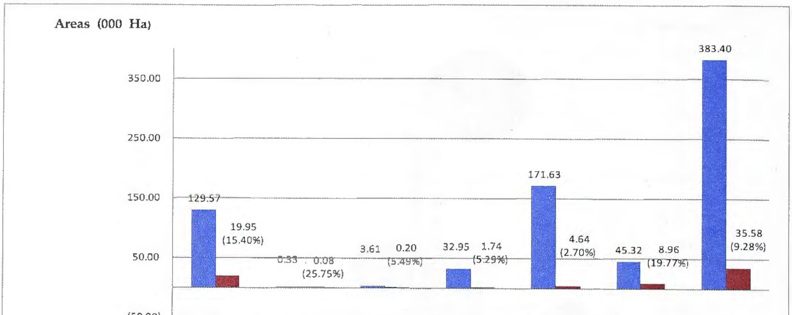
Provinces in Sulawesi	Community forestry (Thousands Ha)	% of total
North Sulawesi &	0.00	0.00%
Central Sulawesi	1.60	39.07%
Southeast Sulawesi	0.65	15.87%
South Sulawesi	1.80	43.83%
West Sulawesi	0.05	1.22%
Total	4.10	100.00%

Provinces in Maluku & Papua	Community forestry (Thousands Ha)	% of total
Maluku	0.40	100.00%
North Maluku	0.00	0.00%
Papua	0.00	0.00%
West Papua	0.00	0.00%
Total	0.40	100.00%

Notes: Percentage in brackets (%) refers to percentage of permit issued in proportion to total areas allocated by MoF

Sources: Adapted from MoF (2010d)

Appendix 7-3. Distribution of areas managed and planted under the *HTR* Programme across different islands in Indonesia



	Sumatra	Java	Bali & Nusa Tenggara	Kalimantan	Sulawesi	Maluku & Papua	Total
Areas allocated (000 Ha)	129.57	0.33	3.61	32.95	171.63	45.32	383.40
Permit issued (000 Ha)	19.95	0.08	0.20	1.74	4.64	8.96	35.58

File: HTR seluruh provinvcel -HTR

Provinces in Sumatra	Areas allocated (Ha)	% permit issued
Aceh	4,826.00	4%
North Sumatra	32,265.00	29%
Jambi	38,963.00	35%
South Sumatra	16,230.00	14%
Bengkulu	19,660.00	18%
Total	111,944.00	100%

Provinces in Java	Areas allocated (Ha)	% permit issued
Banten		
Jakarta		
West Java		
Central Java		
Yogyakarta	327.73	26%
East Java		
Total	327.73	26%

Provinces in Bali & Nusa Tenggara	Areas allocated (Ha)	% permit issued
Bali	375.00	0%
West Nusa Tenggara	3,236.00	6%
East Nusa Tenggara		
Total	3,611.00	5%

Provinces in Kalimantan	Areas allocated (Ha)	% permit issued
West Kalimantan	4,180.00	0%
Central Kalimantan	11,942.00	15%
South Kalimantan	16,823.00	0%
East Kalimantan		
Total	32,945.00	5%

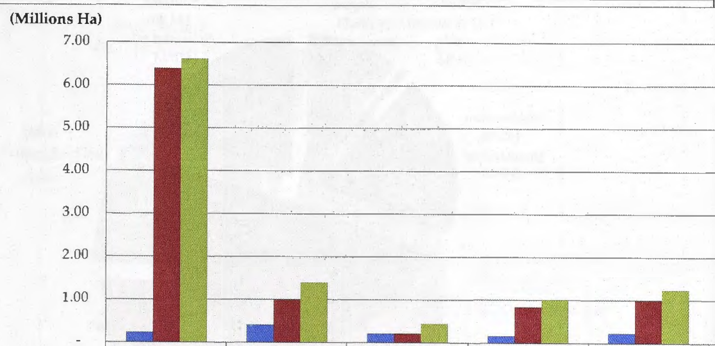
Provinces in Sulawesi	Areas allocated (Ha)	% permit issued
North Sulawesi &	46,365.00	0%
Central Sulawesi	16,030.00	0%
Southeast Sulawesi	51,610.00	9%
South Sulawesi	34,535.00	0%
West Sulawesi	23,090.00	0%
Total	171,630.00	3%

Provinces in Maluku & Papua	Areas allocated (Ha)	% permit issued
Maluku		
North Maluku	15,970.00	37%
Papua	29,350.00	11%
West Papua		
Total	45,320.00	20%

Notes: Percentage in brackets (%) in the figure refers to % of permit issued in proportion to total areas allocated by MoF; Blank spaces refer to no areas allocated.

Source: Adapted from MoF (2010d)

Appendix 7-4. Distribution of areas managed and planted under private tree-growing schemes across different islands in Indonesia



	Sumatra	Java	Bali & Nusa Tenggara	Kalimantan	Sulawesi
Existing areas (Ha)	0.23	0.40	0.22	0.16	0.23
Potential areas (Ha)	6.39	0.99	0.22	0.84	1.00
Total estimated areas (Ha)	6.62	1.39	0.43	1.00	1.22

File: Data HR SPSS.xls - HR Areas & Po

Provinces in Sumatra	Total estimated areas (Ha)	% of total estimated areas to total
Aceh	149,438	2%
North Sumatra	302,542	5%
West Sumatra	404,137	6%
Riau	1,125,292	17%
Jambi	1,267,611	19%
South Sumatra	2,727,407	41%
Bengkulu	150,333	2%
Lampung	491,534	7%
Total	6,618,294	100%

Provinces in Java	Total estimated areas (Ha)	% of total estimated areas to total
West Java & Banten	468,871	34%
Central Java	515,209	37%
East Java	326,345	23%
Yogyakarta	81,751	6%
Jakarta	1,673	0%
Total	1,393,849	100%

Provinces in Bali & Nusa Tenggara	Total estimated areas (Ha)	% of total estimated areas to total
Bali	87,798	20%
East Nusa Tenggara	222,323	51%
West Nusa Tenggara	123,686	29%
Total	433,807	100%

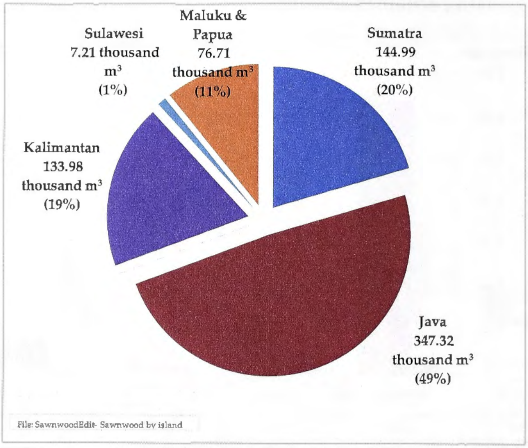
Provinces in Kalimantan	Total estimated areas (Ha)	% of total estimated areas to total
South Kalimantan	506,185	50%
East Kalimantan	137,509	14%
Central Kalimantan	13,798	1%
West Kalimantan	345,918	34%
Total	1,003,410	100%

Provinces in Maluku & Papua	Total estimated areas (Ha)	% of total estimated areas to total
Maluku	6,601	15%
Papua	36,010	85%
Total	42,611	100%

Provinces in Sulawesi	Total estimated areas (Ha)	% of total estimated areas to total
North Sulawesi &	169,321	14%
Central Sulawesi	170,321	14%
South Sulawesi	831,802	68%
Southeast Sulawesi	51,009	4%
Total	1,222,453	100%

Source: MoF and CBS (2003)

Appendix 7-5. Distribution of wood-processing industries: sawn wood



Provinces in Kalimantan	Production (thousand m^3)	Proportion (%)
West Kalimantan	19.91	14.86%
Central	13.50	10.08%
South Kalimantan	8.80	6.57%
East Kalimantan	91.77	68.49%
Total	133.98	100.00%

Provinces in Java	Production (thousand m^3)	Proportion (%)
Banten	5.02	1.45%
Jakarta	6.16	1.77%
West Java	0.17	0.05%
Central Java	144.48	41.60%
Yogyakarta	0.00	0.00%
East Java	191.49	55.13%
Total	347.32	100.00%

Provinces in Maluku	Production (thousand m^3)	Proportion (%)
Maluku	0.47	0.61%
North Maluku	0.00	0.00%
Papua	28.11	36.64%
West Papua	48.13	62.75%
Total	76.71	100.00%

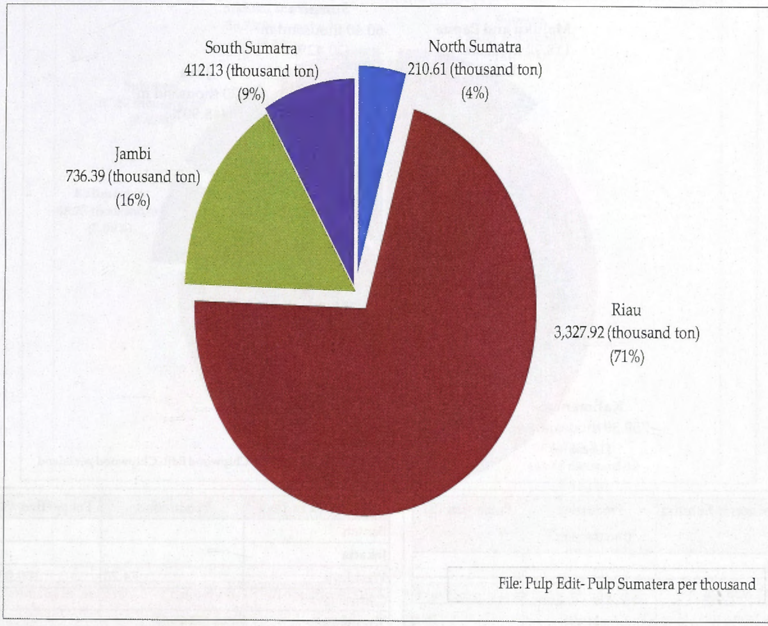
Provinces in Sumatra	Production (thousand m^3)	Proportion (%)
Aceh	0.00	0.00%
North Sumatra	116.85	80.59%
West Sumatra	0.00	0.00%
Riau	14.60	10.07%
Riau Islands	0.00	0.00%
Jambi	0.00	0.00%
South Sumatra	13.50	9.31%
Bangka Belitung	0.00	0.00%
Bengkulu	0.00	0.00%
Lampung	0.05	0.04%
Total	144.99	100.00%

Provinces in Sulawesi	Production (thousand m^3)	Proportion (%)
North Sulawesi & Gorontalo	0.00	0.00%
Central Sulawesi	0.00	0.00%
Southeast	0.00	0.00%
South Sulawesi	7.21	100.00%
West Sulawesi	0.00	0.00%
Total	7.21	100.00%

File: Sawnwood Edit.xls-Sawnwood by island

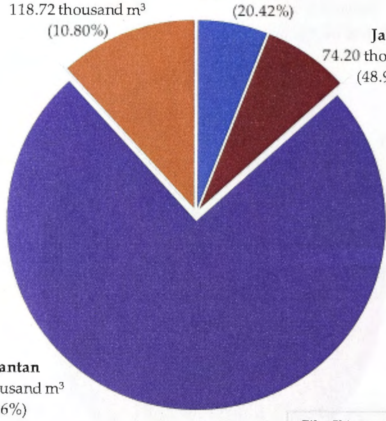
Source: Adapted from MoF (2010d)

Appendix 7-6. Distribution of wood-processing industries: pulpwood



Source: Adapted from MoF (2010d)

Appendix 7-7. Distribution of wood-processing industries: wood chip



Provinces in Sumatra	Production (thousand m^3)	Proportion (%)
Aceh	-	-
North Sumatra	-	-
West Sumatra	-	-
Riau	-	-
Riau Islands	-	-
Jambi	-	-
South Sumatra	60.40	100.00%
Bangka Belitung	-	-
Bengkulu	-	-
Lampung	-	-
Total	60.40	100.00%

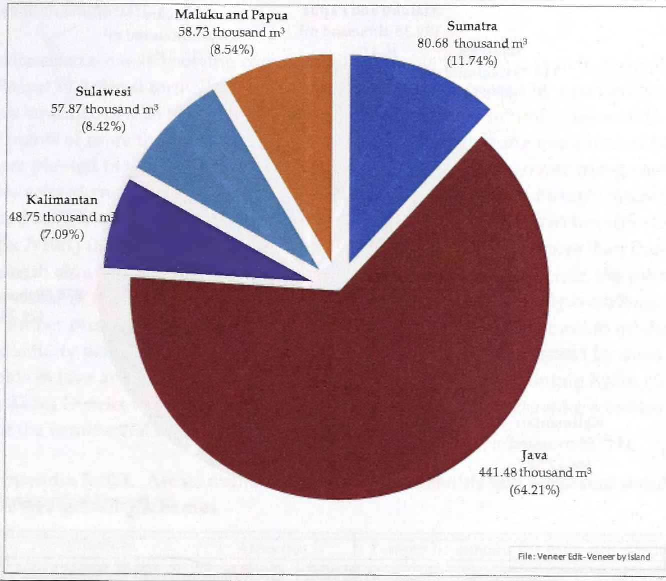
Provinces in Java	Production	Proportion (%)
Banten	-	-
Jakarta	-	-
West Java	74.20	100.00%
Central Java	-	-
Yogyakarta	-	-
East Java	-	-
Total	74.20	100.00%

Provinces in Kalimantan	Production (thousand m^3)	Proportion (%)
West Kalimantan	29.93	3.94%
Central Kalimantan	-	-
South Kalimantan	94.98	12.51%
East Kalimantan	634.49	83.55%
Total	759.39	100.00%

Provinces in Maluku	Production (thousand m^3)	Proportion (%)
Maluku	-	-
North Maluku	-	-
Papua	38.92	32.79%
West Papua	79.79	67.21%
Total	118.72	100.00%

Source: Adapted from MoF (2010d)

Appendix 7-8. Distribution of wood-processing industries: veneer



Provinces in Sumatra	Production (thousand m^3)	Proportion (%)
Aceh	-	-
North Sumatra	-	-
West Sumatra	-	-
Riau	-	-
Riau Islands	-	-
Jambi	20.66	25.60%
South Sumatra	21.05	26.09%
Bangka Belitung	-	-
Bengkulu	1.29	1.60%
Lampung	37.68	46.71%
Total	80.68	100.00%

Provinces in Sulawesi	Production (thousand m^3)	Proportion (%)
North Sulawesi & Gorontalo	-	-
Central Sulawesi	-	-
Southeast Sulawesi	-	-
South Sulawesi	57.87	100.00%
West Sulawesi	-	-
Total	57.87	100.00%

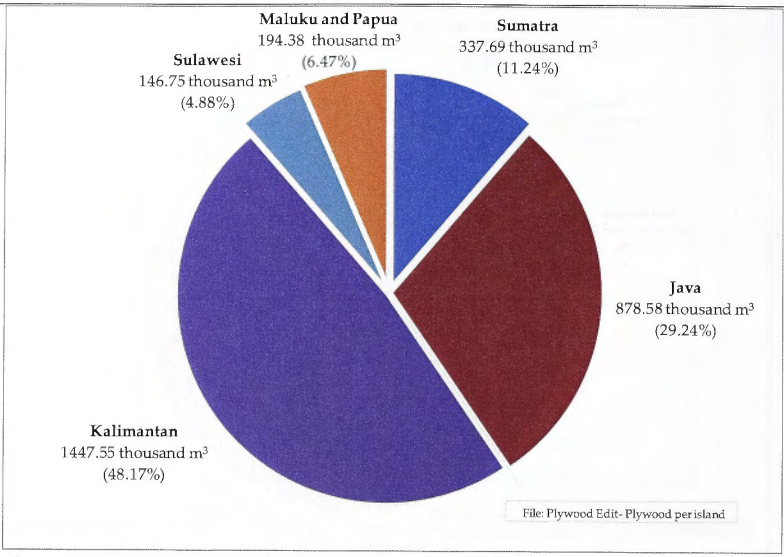
Provinces in Java	Production (thousand m^3)	Proportion (%)
Banten	-	-
Jakarta	-	-
West Java	11.36	2.57%
Central Java	220.95	50.05%
Yogyakarta	-	-
East Java	209.17	47.38%
Total	441.48	100.00%

Provinces in Kalimantan	Production (thousand m^3)	Proportion (%)
West Kalimantan	-	-
Central Kalimantan	19.36	39.71%
South Kalimantan	28.17	57.78%
East Kalimantan	1.23	2.51%
Total	48.75	100.00%

Provinces in Maluku	Production (thousand m^3)	Proportion (%)
Maluku	11.63	19.81%
North Maluku	-	-
Papua	20.39	34.72%
West Papua	26.71	45.48%

Source: Adapted from MoF (2010d)

Appendix 7-9. Distribution of wood-processing industries: plywood



Provinces in Sumatra	Production (thousand m^3)	Proportion (%)
Aceh	-	-
North Sumatra	63.63	18.84%
West Sumatra	-	-
Riau	101.90	30.18%
Riau Islands	3.89	1.15%
Jambi	81.13	24.03%
South Sumatra	14.33	4.24%
Bangka Belitung	-	-
Bengkulu	-	-
Lampung	72.80	21.56%
Total	337.69	100.00%

Provinces in Sulawesi	Production (thousand m^3)	Proportion (%)
North Sulawesi & Gorontalo	-	-
Central Sulawesi	-	-
Southeast Sulawesi	-	-
South Sulawesi	146.75	100.00%
West Sulawesi	-	-
Total	146.75	100.00%

Provinces in Java	Production (thousand m^3)	Proportion (%)
Banten	284.97	32.43%
Jakarta	-	-
West Java	15.95	1.82%
Central Java	203.15	23.12%
Yogyakarta	-	-
East Java	374.51	42.63%
Total	878.58	100.00%

Provinces in Kalimantan	Production (thousand m^3)	Proportion (%)
West Kalimantan	301.21	20.81%
Central Kalimantan	190.53	13.16%
South Kalimantan	341.90	23.62%
East Kalimantan	613.91	42.41%
Total	1447.55	100.00%

Provinces in Maluku	Production (thousand m^3)	Proportion (%)
Maluku	-	-
North Maluku	-	-
Papua	191.16	98.34%
West Papua	3.22	1.66%
Total	194.38	100.00%

Source: Adapted from MoF (2010d)

Appendix 7-10. Lessons learnt from private tree growing

1. General characteristics

In the Indonesian context, growing commercially valuable trees on privately-owned land (*Hutan Rakyat)*is defined formally by the MoF as forest that is owned by a community with a minimum land size of 0.25 hectares, and where a closed canopy of timber trees and/or other types of plants of more than 50% of the area; and/or in the first year a minimum of 500 trees per hectare are planted in the same area (MoF, 2009i). The majority of private tree-growing areas on individually-owned land are in Java, where there were 2.3 million forestry households in 2003, equal to 77% of the total number of national households engaged in forestry (see Table Appendix 7-10.1) (MoF and CBS, 2004). However, outer islands have more than double that number, with almost 900,000 households engaged in forestry. Nevertheless, the estimated standing stocks of 19.1 million m^3, in the outer islands that can potentially contribute to the national timber production figures are lower than those in Java, at 23.4 million m^3 due to the low productivity per hectare. Teak is a very popular timber species planted by most households in Java and in the Province of Yogyakarta, particularly Gunung Kidul District. In Gunung Kidul District well-advanced management of private tree-growing schemes is found, aiming at the commercial market (see Box at Appendix 7-10.1).

Table Appendix 7-10.1. Areas, number of forestry households and estimated standing stocks in private tree-growing schemes

No.	Provinces	Areas (ha) [a]		Forestry households [b]		Estimated standing stocks [c]	
		ha	(%)	Households	(%)	m^3	(%)
1.	Central Java	198,890	6%	926,748	30%	4,457,327	10%
2.	East Java	93,661	16%	964,758	32%	12,557,702	29%
3.	West Java and Banten	79,156	7%	194,902	6%	4,978,836	12%
4.	Yogyakarta	29,139	2%	253,164	8%	1,447,826	3%
5.	DKI Jakarta	-	-	567	0.02%	-	-
Total in Java		400,846	31%	2,339,572	77%	23,441,691	55%
Total outside Java (outer islands)		878,930	69%	711,574	23%	19,194,422	45%
Total Indonesia		1,279,776	100%	3,051,146	100%	42,636,113	100%

File: PHRI jati rev - Summary table HR Ch6

Notes:

a. In the outer islands, the five provinces with the highest areas of private tree growing are: South Sulawesi (150,810 ha), East Nusa Tenggara (150,800 ha), South Kalimantan (136,363 ha), North Sumatra (84,927 ha), and South Sumatra (55,544 ha).

b. Includes households in both urban and rural areas

c. Estimated standing stocks for all timber types; dominant timber types managed by households in Java are teak and *falcataria*, and there is no dominant type in the outer islands

Sources: Notes a. and c. adapted from Muslich and Krisdianto (2006); note b. adapted from MoF and CBS (2004).

Box Appendix 7-10.1. Commercialised timber production under private tree growing in Gunung Kidul District, Yogyakarta Province

The private tree-growing area of Gunung Kidul District comprises 16,119 ha (55% of the total area for the whole province) with a potential area for future development of 50,144 ha and an estimated production of 7.5 m^3 per ha. About 750,000 households were recorded in Gunung Kidul district and most of these were involved in growing teak for timber production. The average number of teak trees managed per household was 28, the highest among all teak production areas in Java in 2004. This timber production contributed Rp 2,425,272 (AUD 288) to household income per household per year.

Gunung Kidul itself is considered one of the most commercialised timber marketing hubs for local, national and international markets. The local and national markets are stimulated by intermediary traders/brokers who supply the wood mainly to furniture-making companies. The international market opportunities were begun in 2005/2006 by local and national NGOs under a national certification scheme endorsed by *LEI-Lembaga Ecolabeling Indonesia (*Indonesian Certification Foundation).

The local district government of Gunung Kidul has recognised the potential benefits from teak tree-growing businesses and has put in place several district-level regulations to stimulate more efficient trading activities. One of these is the procedure for obtaining a letter of permit to transport timber between districts and across province borders.

Sources: Adapted from PERSEPSI and WWF (2003); MoF and CBS (2004); Triple Line Consulting (2005); and Gunung Kidul District Government (2006).

South Sulawesi is one of two provinces with the highest area under private tree growing in the outer islands, at 150,810 ha, and with the highest estimated standing stocks, at 5.4 million m^3 (Muslich and Krisdianto, 2006). In the province of South Sulawesi, an example of a private tree-growing management model for the commercialised timber market in the outer islands is Bulukumba District. The private tree-growing case in Bulukumba District is the other extreme case of teak management in Java that is highly commercialised with high-value timber, based on the low value of the timber grown, such as *Gmelina arborea* and *Paraserianthes falcataria*. Less intensive management and unregulated local timber markets are other characteristics of private tree growing in this district (see Box Appendix 7-10.2).

Box Appendix 7-10.2. Commercialised timber production under private tree growing in Bulukumba District, South-Sulawesi Province

Private tree-growing areas in Bulukumba District comprised an area of 21,843 ha, which was 71% of the total area in 2007. Three main cooperatives were involved in developing plantations of *Gmelina* and *Paraserianthes* with total membership of around 700 households. One household on average manages about 13 trees of *Gmelina* and 30 trees of *Paraserianthes*. The timber produced contributed to the average household income of Rp 7,032,432 (AUD 834) at the end of each rotation.

A medium-scale wood-processing industry based in Palopo, South Sulawesi, PT PAL (*Palopo Alam Lestari*) with a branch in Bulukumba District, requires raw materials for its processing factory which produces plywood. This company has been interested in establishing partnerships with local tree-grower cooperatives under loose contract agreements for distributing free seedlings. However, the company did not require members of the cooperative to sell the timber back to the company PT PAL, mainly because the company was concerned that it would not have enough financial capacity to buy all the timber produced. Nevertheless, the company expected that the cooperatives would sell the wood produced back to the company. However, the arrangement to buy timber grown on privately-owned lands had been impeded by the lack of an overarching policy framework and regulation that would protect this wood from being falsely described as constituting illegally-harvested wood from natural forests.

Middle-men (*Mitra Antara)* played a very important role in distributing seedlings from the company and collecting wood from the community; they handled all the costs of transportation and administration. It was not until 2001 that the local government, through the FDA, initiated regulations in relation to farm forestry rights to timber and non-timber forest products (Perda No. 60/2001), and stipulated the endorsement of harvesting permits (Kusumedi *et al.*, 2007).

Sources: Adapted from Sumirat *et al.* (2005); Kusumedi *et al* (2007); and Fieldwork in Bulukumba (2006 and 2007)

2. *Driving factors for expansion of planted areas*

a. Growing local and export markets: imperfect free market conditions

It has been estimated in the report by the Furniture and Handicraft Association that there were approximately 6,000 medium to large furniture companies in Indonesia in 2005, with a wood demand of 3.2 million m³ per year (Triple Line Consulting, 2005). Further, there could be up to one million small and home-based, unregistered cottage industries acting as sub-contractors for medium to large industries producing cottage industries product lines for export and at the same time providing lower quality wood for the local markets (Triple Line Consulting, 2005).

These growing local and export markets of value-added products have been the major factor in motivating households to develop this form of private tree-growing; these products are made mainly from species such as *falcataria* and teak in Java, and lower value species, such as *gmelina*, in the outer islands. For example, the values of teak furniture exports from Indonesia's main production centre, *Jepara* in Central Java, were over USD 123 million in 2005 (Triple Line Consulting, 2005). Asmindo recorded that 400,000 m³ of wood industry requirements in Jepara were supplied by timber coming from private tree-growing (to which Gunung Kidul alone contributed 100,000 m^3) (Kartodihardjo, 2010). Other sources mentioned that in the year 2000, timber coming from private tree growing contributed 11%, or 900,000 m^3/year, of the total wood supply required by the wood industry in Java (Nawir and Manalu, 2006; Kartodihardjo, 2010).

For *falcataria*, the domestic market is more important, since the export market fluctuates quite significantly (Nawir, 2000; Nemoto, 2002). Unfortunately, statistical information on trading of *falcataria* and other species of wood is not systematically recorded, so total traded values are not fully understood. Although in the outer islands the market has not been as extensive as in the expanding local wood market in Java, the local market stimulated by the local wood-processing industries has created incentives for local households to become involved and invest in tree growing (Sumirat *et al.*, 2005; Kusumedi *et al.*, 2007). Often, this involves companies that distribute free seedlings to local communities (Sumirat *et al.*, 2005; Kusumedi *et al.*, 2007), as further discussed using the illustration based on the company initiative in Bulukumba District.

1. *Secure land ownership status*

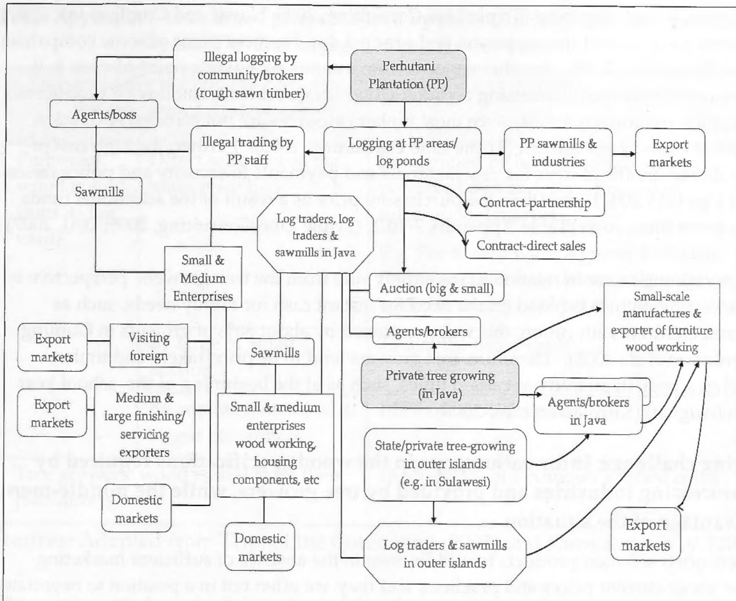
Compared to land status managed by community members under community tree-growing and community-company partnership schemes, community members' land managed under private tree-growing schemes has the most secure land status, regardless of having no land certificate such as the most formal land paper type to confirm its status. However, a lack of land certificate to provide proof of land ownership identity has caused some impediments to timber coming from private tree-growing to meeting the requirements for timber certification (Pers. Comm. Persepsi[27] staff, 18 May 2006). This is because the process of obtaining the land certificate is very expensive and most households cannot afford it, so they rely more on land papers verified locally, such as a document from the Head of Village relating to land status or *SKT-Surat Keterangan Tanah* (Nawir *et al.*, 2003b; Persepsi staff, pers. comm.,18 May 2006 and Fieldwork in Gunung Kidul, 2006).

4. *Challenges for tree growers receiving optimal economic benefits under private tree-growing schemes*

a. Long supply chain: many stakeholders involved in the supply chain

Despite promising opportunities in the growing timber markets in Java and the outer islands, the long supply chain is still the biggest challenge facing tree-grower households in receiving optimal benefits from a commercialised market (DAI, 2007). Overall, the supply chain in Java is longer in comparison to that in the outer islands as well as in comparison to the supply chain for export markets (Nemoto, 2002; Triple Line Consulting, 2005; Kusumedi *et al.*, 2007; DAI, 2007). Teak supply chains for wood coming from Perhutani, farm forestry and illegal sources are presented in Figure Appendix 7-10.1.

[27] Persepsi is an NGO based in Wonogiri, Central Java and has been greatly involved in assisting the local tree-grower cooperative to obtain the sustainable forest management certificate, so that the timber production can use green labelling and be eligible for the certified market.



Source: Adapted from Triple Line Consulting (2005)

Figure Appendix 7-10.1. Diagrammatic representation of the teak supply chain

There were more stakeholders involved in the supply chain of timber coming from Perhutani compared to those involved in similar chains of timber coming from smallholders involved in private tree-growing. Longer supply chains involve, for example, higher unofficial payments, which causes high transaction and transportation costs (Nemoto, 2002; Triple Line Consulting, 2005; Kusumedi *et al.*, 2007; DAI, 2007; Kurniawan *et al.*, 2008). Therefore, small processing wood companies prefer to buy logs through middle-men because it is simpler and does not involve the complicated procedures of purchasing and transporting the logs, including the problems of unofficial payments (accounting for between 15 to 20% of the log prices) (Triple Line Consulting, 2005; Wood trader in Gunung Kidul, pers. comm., 24 August 2007). Further, larger wood-processing industries also have some concerns regarding the wood supply conditions of timber coming from private tree-growing smallholders due to the nature of harvesting, which is based on household cash needs (see Darusman and Hardjanto (2006), Kurniawan *et al.* (2008), Muslich and Krisdianto (2006), and Suharjito (2000)). The arguments support the contention that timber produced by private tree-growing smallholders fits the market for domestic consumption, where lower-grade timber is acceptable to small-scale wood-processing industries.

b. Ensuring the continuity of wood supply

From the timber demand side, such as from the perspective of teak-based wood-processing enterprises, there are concerns regarding the continuity of wood supply from timber produced by households practising private tree growing, as well as meeting the quality specifications for their wood-processing equipment (Triple Line Consulting, 2005; Nawir and ComForLink, 2007). These concerns have limited the expansion and product development plans of some companies (Triple Line Consulting, 2005). Another concern from a company buyer's point-of-view is the difficulty involved in properly assessing certified wood resources from small-scale producers, especially for international markets, since most timber resources are not certified and lack a proper chain of custody assessment (Triple Line Consulting, 2005). Further, the high cost of production due to unofficial costs for raw materials and payments to security and police raises the price of logs to15-20% higher than the purchasing price as a result of the additional funds required to cover these costs (Table Appendix 7-10.2) (Triple Line Consulting, 2005; DAI, 2007).

Another determining factor in relation to the supply side from the tree-growers' perspective is that the harvesting pattern is based on the need for instant cash for family needs, such as weddings and children's education; this was mentioned by about 80% of growers in Gunung Kidul (Kurniawan *et al.*, 2008). Therefore, tree growers tend to be price-takers and timber selling reaches a peak in quantity at certain times, such as at the beginning of the school year around July/August) (Kurniawan *et al.*, 2008).

c. Marketing challenge: information gaps in the wood specifications required by wood-processing industries and provided by tree growers, while the middle-men take advantage of the situation

Smallholders often sell their products to middle-men in the absence of sufficient marketing information about current prices and practices, and they are often not in a position to negotiate higher prices (Kurniawan *et al.*, 2008). Tree growers provide timber of variable quality and as a consequence they receive non-standardised prices with a big difference, even for timber of a similar age and diameter. For example, for 30 cm diameter (at age 25 years), there is about 31% difference between the buying prices of timber coming from two timber management models (Kurniawan *et al.*, 2008). Prices vary and are differentiated between wood being sold that is accompanied by the proper documentation, verifying the place of origin and timber transportation permit, and wood with no papers at all (Pers. comm.,Wood trader in Gunung Kidul, 24 August 2007). Given that timber merchants buying from smallholders have to deal with numerous producers holding timber of variable quality and quantity, transaction costs are high which lead to lower prices to producers (Triple Line Consulting, 2005). For example, for teak wood, tree growers receive lower prices for their timber compared to timber sold by Perhutani, receiving only 15.6%-26.1% of Perhutani's set price (Table Appendix 7-10.2) (Triple Line Consulting, 2005; Kurniawan *et al.*, 2008). Tree growers are paid less than Perhutani even for better grades, but receive the same price for lower quality; therefore, there has been little incentive for tree growers to improve the quality of their timber (Triple Line Consulting, 2005).

Table Appendix 7-10.2. Wood prices received by Perhutani compared with prices received by smallholders engaged in private tree-growing

Different sales method for Perhutani and tree grower teak wood		Set price
Perhutani: wood is sold from its log yards	Direct sales (set as the main price list)	Determined by historic prices and perceived demand, no reference to international market E.g. For timber with diameter 22-28 cm, Perhutani price was listed as Rp 1,830,00 or AUD 217 per m³ (2008)
	By large or small auction	75% of the listed price
	By annual contract with bigger consumers	103% of the listed price
Tree growers: wood is sold from their plantations		15.6%-26.1% of Perhutani's listed price

Sources: Adapted from Triple Line Consulting (2005) and Kurniawan *et al.* (2008)

Observations made in the field indicated that this situation has been going on for a long time and that the quality of timber produced by smallholders has not improved, because most tree growers deal with middle men (Fieldwork in Gunung Kidul, 2006 and 2007; Fieldwork in Bulukumba, 2006 and 2007). Tree growers have never been given adequate product specifications for wood quality as required by the wood industry, because the middle-men have never provided any feedback to tree growers on the standards. So, there has been an information gap between the timber producers and consumers (wood-processing industries). Middle-men have assisted smallholders by covering the costs of harvesting and getting the paper work done for harvesting and transportation permits, as well as dealing with other transaction costs. Nevertheless, middle-men are taking advantage of the information gap between tree-growing smallholders and the wood industries to maximise their own profit margin.

Therefore, to ensure that smallholder tree growers are able to optimise their economic benefits from the commercialised market, it is crucial to improve their understanding of the market specifications and market channels. Therefore, tree growers should only harvest trees of commercial size that correspond to market specifications, and they should be encouraged to form farmers' associations that can disseminate information on market specification of wood products at the quality demanded by the market (Kurniawan *et al.*, 2008).

d. Other limiting factors in enhancing relative advantages of private tree growing as a strategy for commercially-based tree growing

d1. Lack of business skills and financial capital to improve silvicultural practices

Tree growers in general do not have adequate business skills, particularly in managing their plantations, and in the case of teak, it has a long timber rotation. Combining business skills and silvicultural practices is thus required, particularly in managing plantations, by defining the optimal efficiency level from the commercial and technical perspectives. To date, there has also been a lack of extension services provided by the FDA to help improve tree growers' silvicultural knowledge and practices.

Tree-planting management applied by tree growers follows right after harvesting; in this period ten new seedlings are planted after one tree is harvested (Nawir *et al.*, 2007g). Resulting from this practice, smallholder plantations have different tree-age distribution and this is even more difficult to manage in determining the optimal efficiency level of tree management and harvesting so that optimal economic benefits can be generated (Raitzer *et al.*, 2006). Therefore, there are no specific planting and harvesting plans, resulting in the management of the plantation being even more difficult to improve and manage commercially to meet the market demand regularly (Kurniawan *et al.*, 2008). With limited access to capital or credit for investing in teak planting and the financial inability to wait for trees to reach the minimum diameter required by the industry, smallholders find it even more difficult to compete with the state and private plantation companies (Maturana *et al.*, 2005).

d2. Lack of capacity of good institutional and management arrangements

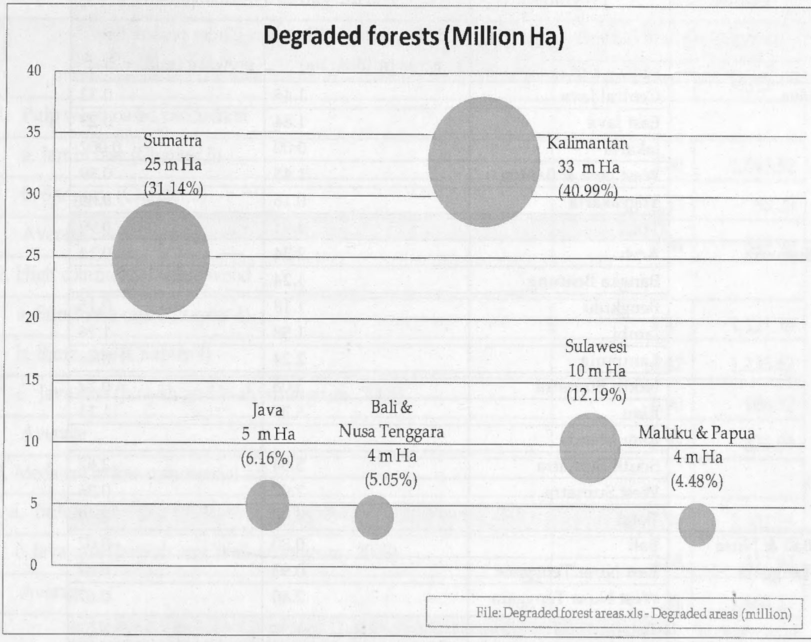
In most cases, tree growers under the private tree-growing scheme do not have good institutional capacity within their association, and in many cases tree growers do not have an association at all to represent them in dealing with middle-men and other buyers to achieve optimal economic benefits. The lack of a strong and professionally-managed grower association with good commercial and business knowledge and skills has contributed to the difficulty encountered in small-scale tree-growing management in taking advantage of the promising market opportunities, for example by heavily depending on market brokers and receiving different prices. Further, the lack of a well organised institution with advisory and marketing capacity has resulted in another impediment to passing the requirements for timber certification (Pers. Comm., Persepsi staff, 18 May 2006).

Strong institutional capacity is also important as an effective way to improve growers' technical skills to optimise their timber productivity. For example, having an organised tree-grower association would facilitate the effective involvement of external agencies, such as the FDA, in providing technical assistance through organised training in silvicultural practices.

However, for tree growers to be interested in organising themselves into such an association, incentives in terms of additional economic benefits that could be generated would have to be significant and self-evident, otherwise, no-one would be interested. If they were members of an organisation, they could negotiate higher buying prices for their timber which could either be sold collectively or be certified as part of a certification scheme.

Important conclusion points for this section are: (1) despite the free market conditions of the wood, tree growers are not ready to take advantage of opportunities from commercialised timber production because they lack the business and financial capacity; (2) documenting the wood required by smallholder industry would lead to a better understanding of wood requirements, so that better targeted strategies to improve timber productivity and total production from areas managed under private tree-growing could be formulated; and (3) a database containing information on the distribution of potential plantation areas would make the planning more realistic and in line with the situation on the ground.

Appendix 7-11. Distribution of total degraded areas in different regions



Notes: Degraded forest refers to: bushes, open spaces, mixed agricultural crops and shrubs, secondary forest and mangrove forest

Source: Baplan(2002b)

Appendix 7-12. Potential areas for developing small-scale tree growing

Islands	Provinces	Potential areas for development	
		Existing degraded forest areas (million ha)[a]	Under private tree-growing (million ha)[b]
Java	Central Java	1.46	0.32
	East Java	1.84	0.23
	Jakarta	0.00	0.002
	West Java & Banten	1.45	0.39
	Yogyakarta	0.16	0.05
	Total	4.91	0.99
Sumatra	Aceh	2.34	0.14
	Bangka Belitung	1.24	-
	Bengkulu	1.18	0.15
	Jambi	1.58	1.26
	Lampung	2.24	0.48
	North Sumatra	3.08	0.22
	Riau	5.32	1.11
	Riau islands	-	-
	South Sumatra	5.84	2.67
	West Sumatra	2.07	0.36
	Total	24.90	6.39
Bali & Nusa Tenggara	Bali	0.30	0.07
	East Nusa Tenggara	0.93	0.07
	West Nusa Tenggara	2.80	0.07
	Total	1.34	0.07
Kalimantan	Central Kalimantan	11.13	0.00
	East Kalimantan	10.34	0.13
	South Kalimantan	1.66	0.37
	West Kalimantan	9.65	0.34
	Total	32.78	0.84
Sulawesi	Central Sulawesi	3.08	0.14
	North Sulawesi &	1.36	0.14
	South Sulawesi	3.78	0.68
	Southeast Sulawesi	1.54	0.03
	West Sulawesi	-	-
	Total	9.74	1.00
Maluku & Papua	Maluku	2.00	0.003
	Maluku Utara	1.58	-
	Papua	-	-
	West Papua	-	-
	Total	3.58	0.003

File: Chapter 6 New Comparisons\Market analysis\Gabungan analisa\Results gabungan.xls - Potential areas

Sources: Analysed from Baplan (2002, 2008), MoF and CBS (2004), and MoF (2010)

Appendix 7-13. Estimated annual household income for each strategy for wood production

Data sources	Annual household income	
	Rp (million)	AUD
1. Pulp wood based production		
a. Jambi case (Chapter 5)	8.80	1,043.52
b. Sanggau (Chapter 5)	0.47	56.29
Average	4.64	549.90
2. High commercial value wood		
a. Sumbawa case (Chapter 4)	9.45	1,121.13
b. Bima case (Chapter 4)	10.42	1,235.62
c. Java case (Jariyah and Wahyuningrum, 2008)	0.90	106.52
Average	6.92	821.09
3. Mediocre to low commercial value		
a. Bulukumba case (FORDA, CIFOR and WWF Indonesia, 2007)	21.94	2,602.55
c. Java case (Jariyah and Wahyuningrum, 2008)	2.68	317.92
Average	12.31	1,460.23

File: Chapter 6 New Comparisons\Market analysis\Gabungan analisa\Results gabungan.xls - Est income per hh

Sources:
For Bulukumba: Adapted from FORDA *et al.* (2007)
For Java case: Jariyah and Wahyuningrum(2008)

References

Achyar HMA, 2005a. Catatan pertemuan verifikasi tingkat desa hasil penelitian tentang bagi hasil pengelolaan hutan bersama masyarakat di Kabupaten Bima (Notes on verification process at village level on the results from study on mutually beneficial benefit sharing arrangement in developing community forestry plantation in Bima District), Dinas Kehutan Bima (Forestry District Agency of Bima), Bima.

Achyar HMA, 2005b. Kompilasi informasi dan data sekunder untuk penelitian tentang bagi hasil pengelolaan hutan bersama masyarakat di Kabupaten Bima (Compilation notes on information and secondary data for study on mutually beneficial benefit sharing agreement in developing community forestry plantation in Bima District), Dinas Kehutan Bima (Forestry District Agency of Bima), Bima.

Achyar HMA, Supriatna, Yusuf, B., Arifin, Z., Irawan, N., Nawir, A. A., Trison, S. and Hakim, M. R., 2006. Studi mengenai bagi hasil yang menguntungkan dalam pengembangan kemitraan hutan tanaman kayu masyarakat di Kabupaten Bima (Study on mutually beneficial benefit-sharing agreement in developing community forestry plantation in Bima District), Bahan pleno multipihak tingkat kabupaten di Kabupaten Bima (Paper for multistakeholder workshop in Bima District), CIFOR (Center for International Forestry Research). WWF (World Wide Fund for Nature) Indonesia, and Dinas Kehutan Bima (Forestry District Agency of Bima), Bima.

Ackermann, F., Eden, C. and Williams, T., 1997. Modelling for litigation: mixing qualitative and quantitative approaches, Interfaces, 27(2): 48-65. Available from: http://www.jstor.org/stable/pdfplus/25062231.pdf (accessed 14/04/2010).

Adhianto, A., 2007. Pemberdayaan Masyarakat di dalam dan di Sekitar Kawasan Hutan (Empowering community living inside and on the surrounding forest areas), Pertemuan Working Group Pemberdayaan Masyarakat, 29 Maret 2007 (Meeting organised by working group on community empowerment, 29 March 2007), Bidang Pemberdayaan Masyarakat dan Lingkungan Hidup Asosiasi Pengusaha Hutan Indonesia-APHI (Division of community empowerment and environmental management of Association of Indonesian Forest Concessionaires), Jakarta.

Adhikari, B., Di Falco, S. and Lovett, J. C., 2004. Household characteristics and forest dependency: evidence from common property forest management in Nepal, Ecological Economics, 48(2): 245-257. Available from: <Go to ISI>://CCC:000189092300007 (accessed 16/06/2008).

Adhikari, B. and Lovett, J. C., 2006. Transaction costs and community-based natural resource management in Nepal, Journal of Environmental Management, 78(1): 5-15. Available from: <Go to ISI>://CCC:000234623500002 (accessed 16/06/2008).

Adi, N. J., Arganata, F., Chehafudin, M., Fuad, F. H., Nugraheni, S. C. A., Sanyoto, R., Soriaga, R. and Walpole, P., 2004. Communities transforming forestlands, Java, Indonesia, A collaborative study by Lembaga ARuPA, Yayasan Koling and Asia Forest Network. Community Forest Management Trends in Southeast Asia, ARuPA, Yogyakarta. Available from: http://www.arupa.or.id/download/afneng.pdf (accessed 23/01/2011).

Adiwinata, A. S., 1999. Insights for more responsible palm oil expansion in Indonesia: looking at the forest benefits for forest dependent people, Research project submitted in partial fulfilment of Master Degree in Environmental Management and Development (Unpublished) National Centre for Development Studies, Australian National University (ANU), Canberra.

Agrawal, A., Chhatre, A. and Hardin, R., 2008. Changing governance of the world's forests, Science, 320(5882): 1460-1462. Available from: http://www.sciencemag.org/content/320/5882/1460.full (accessed 29/10/2012).

Albano, A. and Takeda, S., 2014. Conserving Forests in Privatized Commons: Trends and Management Options in an Ifugao Village, Philippines, Small-Scale Forestry, 13(1): 1-17.

Alemagi, D., Hajjar, R., David, S. and Kozak, R., 2012. Benefits and Barriers to Certification of Community-Based Forest Operations in Cameroon: An Exploratory Assessment, Small-Scale Forestry, 11(4): 417-433. Available from: http://dx.doi.org/10.1007/s11842-011-9192-9 (accessed 23/03/2014).

Andersson, A. E. and Brannlund, R., 1987. The demand for forest sector products, In The global forest sector: An analytical perspective, (Eds, Kallio, M., Dykstra, D. P. and Binkley, C. S.), John Wiley and Sons, New York, pp. 255-277.

Andria, A. Y., 2009. Keterkaitan faktor biofisik dan penguasaan lahan hutan dengan kerawanan kebakaran hutan dalam perspektif penataan ruang (Studi kasus pada wilayah Hutan Tanaman Industri di Jambi) (The link between the biophysical factors and land occupation with the vulnerability condition to forest fire from spatial perspectives), Master Degree Thesis, Sekolah Pasca sarjana (Postgraduate Programme), Institut Pertanian Bogor (Bogor Agricultural University), Bogor.

Angelsen, A. and Wunder, S., 2003. Exploring the forest-poverty link: Key concepts, issues and research implications, CIFOR Occasional Peper No. 40, Center for International Forestry Research (CIFOR), Bogor.

Anonymous, 2009a. PT WKS Jambi realisasikan tanaman seluas 293,812 ha (WKS implemented its 293,812 ha plantations), In Veto News, 6 August 2009. Available from: http://www.vetonews.com/index.php?option=com_content&view=article&catid=19%3AHeadline+Ekonomi+Bisnis&id=1967%3APT+WKS+Jambi+Realisasikan+Tanaman+Seluas+293.812+Hektar&Itemid=2 (accessed 07/05/2011).

Anonymous, 2009b. PT WKS pastikan target penanaman tercapai (WKS ensures that the planting target can be achieved), In Veto News, 6 August 2009. Available from:

http://vetonews.com/index.php?option=com_content&view=article&id=1965%3APT+WKS+Pastikan+Target+Penanaman+Tercapai&Itemid=34 (accessed 07/05/2011).

Anonymous, 2010a. Harga karet di Jambi naik (Rubber prices have increased in Jambi), In Media Indonesia.Com, 27 September 2010. Available from: http://www.mediaindonesia.com/read/2010/09/09/171096/126/101/Harga-Karet-di-Jambi-Naik (accessed 10/08/2011).

Anonymous, 2010b. Harga TBS kelapa sawit di Jambi periode 6-20 October 2010 (The price of fresh fruit bunches in Jambi for the period 6-20 October 2010), In Plant for the future, 11 October 2010. Available from: http://www.mediaindonesia.com/webtorial/asianagri/ (accessed 10/08/2011).

Antara Newspaper, 2011. Industri kayu wajib lolos verifikasi sampai 2013 (The timber industry must pass verification through 2013), In Bisnis Indonesia, 13 August 2011. Available from: http://bisnis-jabar.com/index.php/berita/industri-kayu-wajib-lolos-verifikasi-sampai-2013 (accessed 08/01/2012).

Antinori, C. and Bray, D. B., 2005. Community forest enterprises as entrepreneurial firms: Economic and institutional perspectives from Mexico, World Development, 33(9): 1529-1543. Available from: <Go to ISI>://CCC:000231830600010 (accessed 05/03/2008).

Anwar, C., 2001. Manajemen and teknologi budidaya karet (Rubber plantation management and technology), Pusat Penelitian Karet, Departemen Pertanian (Rubber Research Center, Ministry of Agirculture), Medan.

Anyonge, C. H. and Roshetko, J. M., 2003. Farm-level timber production: orienting farmers towards the market, Unasylva, 212(54): 48-56. Available from: ftp://ftp.fao.org/docrep/fao/005/y4744e/y4744e11.pdf (accessed 08/01/2008).

Ardiansyah, F. 2006. Realising sustainable oil palm development in Indonesia - Challenges and opportunities, Paper presented at the International Oil Palm Conference 2006, 20 June 2006, Bali, Indonesia. WWF (World Wide Fund for Nature) - Indonesia. Available from: http://assets.panda.org/downloads/wwfpaperrealisingsustpalmoil.pdf (accessed 21/11/2006).

Armentano, D. T., 1992. Foreword: Property rights, efficiency, and social welfare In Welfare economics and externalities in an open ended universe: A modern Austrian perspective by Roy E. Cordato, Kluwer Academic Publishers, Boston, Dordrecht, and London.

Armstrong, J. S., 2006. Findings from evidence-based forecasting: Methods for reducing forecast error, International Journal of Forecasting, 22(3): 583-598. Available from: <Go to ISI>://CCC:000239674500009 (http://www.elsevier.com) (accessed 18/03/2010).

Arnold, J. E. M., 1997a. Framing the issues, In Farms, trees and farmers: Responses to agricultural intensification, (Eds, Arnold, J. E. M. and Dewees, P. A.), Earthscan, London.

Arnold, J. E. M., 1997b. Trees as Out-grower Crops for Forest Industries: Experience from the Philippines and South Africa, Network Paper 22a, Rural Development Forestry Network ODI.

Arnold, J. E. M., 1998. Devolution of control of common pool resources to local communities: experiences in forestry, Prepared for the meeting of the UNU/WIDER Project on 'Land Reform Revisited: Access to Land, Rural Poverty, and Public Action', 26-28 April 1998, Santiago, Chile. Available from: http://www.fao.org/regional/lamerica/eventos/1998/abril/tierra/devolut.pdf (accessed 11/08/2008).

Arnold, J. E. M., 2001a. Forestry, poverty and aid, Occasional Paper No. 33, Center for International Forestry Research (CIFOR), Bogor.

Arnold, J. E. M., 2001b. Forests and People: 25 years of Community Forestry, Food and Agriculture Organisation of the United Nations, Rome.

ARuPA, 2002a. Hutan rakyat Wonosobo: Kearifan rakyat yang menjadi sumber inspirasi Perda No. 22/2001. Farm forestry in Wonosobo: community wisdom behind the local government regulation No. 22/2001 ARuPA, Yogyakarta. Available from: http://www.arupa.or.id/index.php?option=com_content&task=view&id=39&Itemid=8> (accessed 23/01/2011).

ARuPA, 2002b. Perda PSDHBM Wonosobo, menembus batas keadilan legal formal (District regulation on PSDHBM Wonosobo, penetrating the legal formal justice boundary ARuPA, Yogyakarta. Available from: http://www.arupa.or.id/index.php?option=com_content&task=view&id=35&Itemid=8 (accessed 23/01/2011).

ASMINDO, Undated. Overview of Indonesia furniture and handicraft industry, ASMINDO - Indonesia Furniture Industry and Handicraft Association, Jakarta. Available from: http://www.timbertradeactionplan.info/images/11%20-%20ASMINDO%20presentation%20Indonesia.pdf (accessed 23/04/2009).

Atindogbe, G., Fonton, N. H., Fandohan, B. and Lejeune, P., 2012. Characterization of private teak (Tectona grandis L.f.) plantations in the Atlantic Department of South Benin, Biotechnologie Agronomie Societe Et Environnement, 16(4): 441-451. Available from: <Go to ISI>://WOS:000312893100003 (accessed 23/03/2014).

Auer, M. R., 2012. Group Forest Certification for Smallholders in Vietnam: An Early Test and Future Prospects, Human Ecology, 40(1): 5-14. Available from: <Go to ISI>://WOS:000302748900002 (accessed 23/03/2014).

Bae, J. S., 2011. Republic of Korea proven fact: forest rehabilitation on degraded land, forest rehabilitation on degraded land, UNCCD Publication, Seoul, Republic of Korea. Available from: http:/www.cifor.org/nc/online-library/browse/view-publication/publication/3590.html (accessed 23/04/2014).

Bampton, J. and Cammaert, B., 2007. Can timber rents better contribute to poverty alleviation through community forestry in the Terai Region of Nepal?, In A cut for the poor. Proceedings of the International Conference on Managing Forests for Poverty Reduction: Capturing opportunities in forest harvesting and wood processing for the benefit of the poor. Ho Chi Minh City, Vietnam 3-6 October 2006, (Eds, Oberndorf, R., Durst, P., Mahanty, S., Burslem, K. and Suzuki, R.), FAO and RECOFT, Bangkok, pp. 10-18.

Baplan, 2002a. Database for MP-RHL (Master Plan - Forest and Land Rehabilitation), Baplan - Badan Planologi Kehutanan (Forest Planology Agency), Ministry of Forestry, Jakarta.

Baplan, 2002b. Kebijakan penyusunan MP-RHL (Master Plan - Forest and Land Rehabilitation). Presentation by Dr. Dwi Sudharto di CIFOR, Bogor, 30 Agustus 2002 (Policy formulation for MP-RHL (Master Plan - Forest and Land Rehabilitation) Presentation by Dr. Dwi Sudharto at CIFOR, Bogor, August 30, 2002), Baplan - Badan Planologi Kehutanan (Forest Planology Agency), Ministry of Forestry, Jakarta.

Baplan, 2008. Rencana kerja Badan Planologi Kehutanan Tahun 2009, (Working plan of Forestry Planology Agency year 2009) Baplan - Badan Planologi Kehutanan (Forestry Planology Agency), Departemen Kehutanan (Ministry of Forestry), Jakarta.

Barr, C., 2001. The Political-Economy of Fibre and Finance in Indonesia's Pulp and Paper Industries, Banking on Sustainability: Structural Adjustment and Forestry Reform in Post-Suharto Indonesia, Center for International Forestry Research and WWF (World Wide Fund for Nature) - Macroeconomics Program Office, Jakarta.

Benbasat, I., Goldstein, D. K. and Mead, M., 1987. The case research strategy in studies of information systems, MIS Quarterly, 11(3): 369-386. Available from: http://www.jstor.org/stable/248684 (accessed 15/04/2010).

Berkes, F., Feeny, B. J., McCay and Acheson, J. M., 1989. The benefits of the commons, Nature, 340: 91-93. Available from: http://www.nature.com/nature/journal/v340/n6229/pdf/340091a0.pdf (accessed 23 September 2008).

Berkes, F., George, P. and Preston, R., 1991. Co-management: the evolution of the theory and practice of joint administration of living resources, Alternatives, 18(2): 12-18.

Bertomeu, M., 2012. Growth and yield of maize and timber trees in smallholder agroforestry systems in Claveria, northern Mindanao, Philippines, Agroforestry Systems, 84(1): 73-87. Available from: <Go to ISI>://WOS:000299054600006 (accessed 23/03/2014).

Bertomeu, M. and Gimenez, J. C., 2006. Improving adoptability of farm forestry in the Philippine uplands: a linear programming model, Agroforestry Systems, 68(1): 81-91. Available from: <Go to ISI>://CCC:000240613500008 (accessed 21/08/2009).

BI, 2009. Laporan Perekonomian Indonesia Tahun 2009 (Indonesia Annual Economics Report 2009) Direktorat Riset Ekonomi dan Kebijakan, BI (Bank Indonesia) (Directorate of Research on Economics and Policy, Bank of Indonesia) Jakarta. Available from: http://www.bi.go.id/web/id/Publikasi/Laporan+Tahunan/Laporan+Perekonomian+Indonesia/lpi_09.htm (accessed 29/07/2010).

BI, 2011. Laporan perekonomian Indonesia Tahun 2010 (Economic report for Indonesia year 2010), BI (Bank Indonesia) -Direktorat Riset Ekonomi dan Kebijakan Moneter (Bank of Indonesia, Directorate of Economic Research and Monetary Policy), Jakarta. Available from: http://www.bi.go.id/web/id/Publikasi/Laporan+Tahunan/Laporan+Perekonomian+Indonesia/lpi_2010.htm (accessed 02/11/2010).

Binkley, C. S., 1987. Economic models of timber supply, In The global forest sector: An analytical perspective, (Eds, Kallio, M., Dykstra, D. P. and Binkley, C. S.), John Wiley and Sons, New York, pp. 109-136.

Black, J., 2002. A dictionary of economics, Oxford reference online, Oxford University Press, Australian National University. Available from: http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t19.e2498 (accessed 1 September 2008).

Bliss, J. C. and Kelly, E. C., 2008. Comparative advantages of small-scale forestry among emerging forest tenures, Small-Scale Forestry, 7: 95-104.

BPK Makassar, 2006. Tabel volume untuk beberapa tanaman kehutanan (Volume table for several tree species), BPK (Badan Penelitian Kehutanan) Makassar, Badan Penelitan dan Pengembangan Kehutanan, Kementrian Kehutanan - Agency for forestry research Makasssar, Forestry Research and Development Agency (FORDA), Ministry of Forestry Makassar.

BPS, 1994. Indeks Harga Konsumen di 27 Kota di Indonesia (1989=100) (Consumer Price Indices in 27 Cities in Indonesia 1994 (1989 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 1995. Indeks Harga Konsumen di 27 Kota di Indonesia (1989=100) (Consumer Price Indices in 27 Cities in Indonesia 1995 (1989 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 1996. Indeks Harga Konsumen di 27 Kota di Indonesia (1989=100) (Consumer Price Indices in 27 Cities in Indonesia 1996 (1989 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 1997. Indeks Harga Konsumen di 27 Kota di Indonesia (1989=100) (Consumer Price Indices in 27 Cities in Indonesia 1997 (1989 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 1998. Indeks Harga Konsumen di 44 Kota di Indonesia (1996=100) (Consumer Price Indices in 44 Cities in Indonesia 1998 (1996 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 1999. Indeks Harga Konsumen di 43 Kota di Indonesia (1996=100) (Consumer Price Indices in 43 Cities in Indonesia 1999 (1996 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2000. Indeks Harga Konsumen di 43 Kota di Indonesia (1996=100) (Consumer Price Indices in 43 Cities in Indonesia 2000 (1996 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2001. Indeks Harga Konsumen di 43 kota di Indonesia 2001 (1996=100) (Consumer Price Indices in 43 Cities in Indonesia 2001 (1996 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2002. Indeks Harga Konsumen di 43 kota di Indonesia 2002 (1996=100) (Consumer Price Indices in 43 Cities in Indonesia 2002 (1996 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2003. Indeks Harga Konsumen di 43 kota di Indonesia 2003 (1996=100) (Consumer Price Indices in 43 Cities in Indonesia 2003 (1996 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2004. Indeks Harga Konsumen di 45 kota di Indonesia 2004 (2002 = 100) (Consumer Price Indices in 45 Cities in Indonesia 2004 (2002 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2005a. Indeks Harga Konsumen di 45 kota di Indonesia 2005 (2002=100) (Consumer Price Indices in 45 Cities in Indonesia 2005 (2002 = 100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2005b. Survey Sosial Ekonomi Nasional (SUSENAS) (National Socioeconomic Survey), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2006. Indeks Harga Konsumen di 45 kota di Indonesia 2006 (2002=100) (Consumer Price Indices in 45 Cities in Indonesia 2006 (2002=100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2007. Indeks Harga Konsumen di 45 kota di Indonesia 2007 (2002=100) (Consumer Price Indices in 45 Cities in Indonesia 2006 (2002=100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2008. Indeks Harga Konsumen di 66 kota di Indonesia 2008 (2007=100) (Consumer Price Indices in 66 Cities in Indonesia 2008 (2007=100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS, 2009. Indeks Harga Konsumen di 66 kota di Indonesia 2009 (2007=100) (Consumer Price Indices in 66 Cities in Indonesia 2009 (2007=100)), BPS-Biro Pusat Statistik (Central Bureau of Statistics), Jakarta.

BPS Bima, 2010. Bima dalam angka 2010 (Bima in figures 2010), Badan Perencanaan Pembangunan Daerah Kabupaten Bima - Regional Development Planning Board of Bima Regency and BPS (Badan Pusat Statistik) Kabupaten Bima - Statistics of Bima Regency, Bima.

BPS Jambi, 2010. Jambi dalam angka 2009 (Jambi in Figures 2009), BPS-Biro Pusat Statistik (CBS-Central Bureau of Statistics), Jambi.

BPS Kalimantan Barat, 2010. Kalimantan Barat dalam angka 2009 (West Kalimantan in Figures 2009), BPS-Biro Pusat Statistik (CBS-Central Bureau of Statistics), Pontianak.

BPS Sumbawa, 2008. Sumbawa dalam angka 2007/2008 (Sumbawa in figures 2007/2008), BPS (Badan Pusat Statistik) Kabupaten Sumbawa - Statistics of Sumbawa Regency, Yogyakarta. 26/04/2010).

Brauers, J. and Weber, M., 1988. A new method of scenario analysis for strategic planning, Journal of Forescasting, 7: 31-47.

Bray, D. B. and Merino-Perez, L., 2002. The rise of community forestry in Mexico: History, concepts, and lessons learned from twenty-five years of community timber production, A report in partial fulfillment of grant no. 1010-0595, The Ford Foundation. Available from: <http://www.fiu.edu/~brayd/Ford%20Mexico%20Report-Bray-bib%20corrected1.doc> (accessed 17/07/2009).

BRLKT, 1995. Rencana anggaran kegiatan pembangunan Hutan Kemasyarakatan (HKm) di Pulau Sumbawa (Project plan community forestry Hkm 1994 - 1999), Buku I, Perencanaan Proyek (Project Plan) Pembangunan Hutan Kemasyarakatan di Pulau Sumbawa, Propinsi Nusa Tenggara Barat Tahun 1994-1999 (Book I, Project plan on the development of community forestry program in Sumbawa Island, West Nusa Tenggara Province Year 1994-1999), Sub BRLKT (Balai Rehabilitasi Lahan dan Konservasi Tanah) DAS Dodokan Moyo Sari, Mataram (Sub-center for land rehabilitation and soil conservation, Dodokan Moyo Sari Watershed), Mataram.

Broadhead, J. and Dubé, Y. C., 2003. Cross-sectoral policy impacts in forestry, Paper submitted to the XII World Forestry Congress, Quebec City, Canada, FAO, Rome. Available from: http://www.fao.org/DOCREP/ARTICLE/WFC/XII/0179-C1.HTM (accessed 12/05/2009).

Burger, J. and Gochfeld, M., 1998. The tragedy of the commons: 30 years later, Environment, 40(10): 4-13, 26-27. Available from: http://proquest.umi.com/pqdweb?index=13&did=36782238&SrchMode=3&sid=1&Fmt=6&VInst=PROD&VType=PQD&RQT=309&VName=PQD&TS=1217547049&clientId=20870&aid=1 (accessed 31 July 2008).

Bustomi, S., Harbagung and Siswanto, B. E., 2006. Tariff-tabel volume beberapa jenis pohon hutan tanaman di Propinsi Jawa Timur (Tariff-table volume several species of tree plantation in East Java Province), Badan Penelitian dan Pengembangan Kehutanan, Pusat Litbang Hutan Tanaman (Forestry

Research and Development Agency, Center for research on forestry plantation), Bogor.

Byron, N. and Arnold, M., 1999. What futures for the people of the tropical forests?, World Development, 27(5): 789-805. Available from: <Go to ISI>://CCC:000080453100002 (accessed 29/07/2009).

Byron, R. N., 1995. Tree farming by small farmers on degraded lands in Central Vietnam, Forestry Chronicle, 71(2): 183.

Byron, R. N., 2001. Keys to smallholder forestry in developing countries in the tropics, In Sustainable farm forestry in the tropics: Social and economic analysis and policy (New horizons in environmental economics) (Eds, Harrison, S. R. and Herbohn, J. L.), Edward Elgar, Cheltenham, pp. 211-226.

Cahyaningsih, N., 2008. Reformulasi kebijakan: Kriteria dan Indikator Monitoring dan Evaluasi HKm Lampung Barat (Policy reformulation: Crietria and indicator on monitoring and evaluation on HKm in West Lampung) Warta Tenure, 6(September): 29-30. Available from: www.wg-tenure.org (accessed 17/12/2010).

Cahyaningsih, N., Pasya, G. and Warsito, 2006. Hutan Kemasyarakatan Kabupaten Lampung Barat: Panduan cara memproses perijinan dan kiat sukses menghadapi evaluasi (Community Forestry in West Lampung District: Guidance to submit an application and for having successful evaluation), Dinas Kehutanan (Forestry Agency), PSDA Kabupaten Lampung Barat (PSDA West Lampung District), and World Agroforestry Center - Southeast Asia, Bogor.

Cairns, 2000. Outgrower Timber Schemes in Kwazulu - Natal: Do they build sustainable rural livelihoods and what intervention should be made?, A contribution to the IIED-CSIR Coordinated Project: Instrument for Sustainable Private Sector Forestry, IIED, London.

Calderon, M. and Nawir, A. A., 2004. An evaluation of the feasibility and benefits of forest partnerships to develop tree plantations: case studies in the Philippines. CIFOR Working Paper No. 27, Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Camino Velozo, R. d., 1987. Incentives for community involvement in conservation programmes, FAO Conservation Guide 12, FAO, Rome. Available from: http://www.fao.org/docrep/006/T0039E/T0039e00.htm#cont (accessed 04/09/2009).

Carle, J., 2007. Vulnerabilities of smallholder plantings, Unasylva, 58(228 2007/3): 59. Available from: ftp://ftp.fao.org/docrep/fao/010/a1346e/a1346e14.pdf (accessed 08/01/2008).

Carlsson, L. and Berkes, F., 2005. Co-management: concepts and methodological implications, Journal of Environmental Management, 75(1): 65-76. Available from: <Go to ISI>://CCC:000227957400006 - http://www.apnet.com (accessed 11/03/2008).

Carment, D., 2003. Assessing state failure: implications for theory and policy, Third World Quarterly, 24(3): 407-427.

Carney, D., Drinkwater, M., Rusinow, T., Neefjes, K., Wanmali, S. and Singh, N., 1999. Livelihoods approaches compared, A brief comparison of the livelihoods approaches of the UK Department for International Development (DFID), CARE, Oxfam and the United Nations Development Programme (UNDP), DFID. Available from: http://www.start.org/Program/advanced_institute3_web/p3_documents_folder/Carney_etal.pdf (accessed 24/09/2009).

Case, D., 1990. The Community' s Toolbox: The Idea, Methods, and Tools for Participatory. Community Forestry Field Manual 2, Food and Agricultural Organisation of the United Nations, Bangkok.

Cerin, P. and Karlson, L., 2002. Business incentives for sustainability: a property rights approach, Ecological Economics, 40(1): 13-22. Available from: <Go to ISI>://CCC:000173716100002 - http://www.elsevier.nl (accessed 27/05/2009).

Chambers, R. and Leach, M., 1987. Trees to meet contingencies: savings and security for the rural poor, Network Paper 5a. Social Forestry Network ODI (Overseas Development Institute), London. Available from: http://www.odi.org.uk/resources/download/634.pdf (accessed 25/08/2009).

Charnley, S. and Poe, M. R., 2007. Community forestry in theory and practice: Where are we now?, Annual Review of Anthropology, 36: 301-336. Available from: <Go to ISI>://CCC:000250319300019 (accessed 12/03/2008).

Charter, N., 2001. The politics of the environments: Ideas, activism, and policy, Cambridge University Press, Cambridge.

Chokkalingam, U., Sabogal, C., Almeida, E., Carandang, A. P., Gumartini, T., de Jong, W., Júnior, S. B., Lopez, A. M., Murniati, Nawir, A. A., Rumboko, L., Toma, T., Wollenberg, E. and Zaizhi, Z., 2005. Local participation, livelihood needs and institutional arrangements: Three keys to sustainable rehabilitation of degraded tropical forest lands, In Beyond Planting Trees: Restoring Forests and their Functions in Landscapes? .

CIFOR and ICRAF, 2006. Project proposal to ACIAR: Improving economic outcomes for smallholders growing teak in Indonesia (FST/2005/177), Centre for International Forest Research (CIFOR) in collaboration with World Agroforestry Centre (ICRAF), Bogor.

CIFOR Rehab Team, 2003. Project proposal 'Review of forest rehabilitation initiatives - Lessons from the past', CIFOR and the Government of Japan, Bogor.

Ciriacy-Wantrup, S. V. and Bishop, R. C., 1975. Common property as a concept in natural resources policy, Natural Resources Journal, 15: 713-727. Available from: http://www.heinonline.org/HOL/PDF?handle=hein.journals/narj15&collection=journals&id=731&print=16&ext=.pdf (accessed 01/09/2008).

Cleaver, F., 2005. The inequality of social capital and the reproduction of chronic poverty, World Development, 33(6): 893-906.

Coase, R. H., 1960. The problem of social cost, Journal of Law and Economics, III: 1-44.

Colchester, M., 2002a. Bridging the gap: Challenges to community forestry networking in Indonesia, Learning from international community forestry networks: Indonesia country study, CIFOR, Bogor. Available from: http://www.cifor.cgiar.org/publications/pdf_files/CF/Indonesia_CF.pdf (accessed 28/04/2009).

Colchester, M., 2002b. Towards community forestry in Indonesia, WRM's bulletin No. 63, WRM (World Rainforest Movement). Available from: http://www.wrm.org.uy/bulletin/63/Indonesia.html (accessed 03/12/2008).

Colfer, C. J. P. and Byron, Y. (Eds.), 2001. People managing forests: the links between human well-being and sustainability, Resources for the Future and CIFOR, Washington, DC.

Colfer, C. J. P. and Dudley, R. G., 1993. Shifting cultivators of Indonesia: Marauders or managers of the forest?, Community forestry shifting cultivation series, FAO, Rome. Available from: http://www.fao.org/DOCREP/006/U9030E/U9030E00.HTM#TopOfPage (accessed 03/09/2009).

ComForLink, 2005. Bahan diskusi informal dengan Departemen Kehutanan, Manggala Wanabhakti, 11 Agustus 2005, (Paper prepared for informal discussion with Ministry of Forestry, Manggala Wanabhakti, 11 August 2005), ComForLink (Community-Company Forest Link) - Forum communication to support mutually-beneficial community-company partnership arrangements facilitated by CIFOR, Bogor.

Cosyns, H., Damme, P., Wulf, R. and Degrande, A., 2013. Can Rural Development Projects Generate Social Capital? A Case Study of Ricinodendron heudelotii Kernel Marketing in Cameroon, Small-Scale Forestry: 1-20. Available from: http://dx.doi.org/10.1007/s11842-013-9247-1 (accessed 23/04/2014).

Current, D., Lutz, E. and Scherr, S., 1995. Costs, benefits, and farmer adoption of agroforestry, In Costs, benefits, and farmer adoption of agroforestry. Project experience in Central America and the Caribbean (A CATIE-IFPRI-World Bank Project funded by UNDP). World Bank Environment Paper Number 14, World Bank Symposium, (Eds, Current, D., Lutz, E. and Scherr, S.), World Bank, Washington, pp. 1-27.

DAI, 2007. Analisa pasar: Rantai nilai industri furnitur (Market analysis:value chain furniture industry), USAID (the United States Agency for International Development) and SENADA, Jakarta.

Darusman, D. and Hardjanto, 2006. Tinjauan ekonomi hutan rakyat (The economic overview of farm forestry), Proceeding of research results seminar organised by Forestry Research and Development Agency (FORDA) Ministry of

Forestry (MoF), the Government of Indonesia, Bogor. Available from: http://www.dephut.go.id/files/Pot_Klbg_HR.pdf (accessed 30/04/2009).

Daryanto, H. and Purwonegoro, J., No year. Forest product industries in Indonesia: Securing timber from legal sources, Directoral General of Forest Production Management, Ministry of Forestry, and Forest Industry Revitalization Body (BRIK-Badan Revitalisasi Industri Kehutanan), Jakarta.

Davis, J. and Richards, M., 1999. The use of economics to assess stakeholder incentives in participatory forest management: a review, Overseas Development Institute, London.

Dewees, P. A., 1997. Farmer response to tree scarcity: the case of woodfuel, In Farms, tress and farmers: Responses to agricultural intensification, (Eds, Arnold, J. E. M. and Dewees, P. A.), Earthscan, London.

Dewees, P. A. and Saxena, N. C., 1997a. Tree planting and household land and labour allocation: case studies from Kenya and India, In Farms, tress and farmers: Responses to agricultural intensification, (Eds, Arnold, J. E. M. and Dewees, P. A.), Earthscan, London.

Dewees, P. A. and Saxena, N. C., 1997b. Wood product market as incentives for farmer tree growing, In Farms, tress and farmers: Responses to agricultural intensification, (Eds, Arnold, J. E. M. and Dewees, P. A.), Earthscan, London.

DFID, 1999. Sustainable livelihoods guidance sheets, DFID - Department for International Development, London. Available from: http://www.livelihoods.org/info/info_guidancesheets.html (accessed 28/05/2008).

Director General of Forestry Production Management 2006 In Presentation at the National Workshop on Community-based Plantation Program, 20 December 2006.Ministry of Forestry, Jakarta, Indonesia.

Director of Tanjung Redeb Hutani, 2006. Pemberdayaan masyarakat sekitar hutan tanaman IUPHHK pada hutan tanaman PT Tanjung Redeb Hutani: Bahan presentasi untuk pertemuan Pokja Pemberdayaan Masyarakat, 20 Juli 2006(Empowering community living on the surrounding Industrial Timber Plantation areas of Tanjung Redeb Hutani: Presentation material for the meeting organised by working group on community empowerment, 20 July 2006), Direktorat Jenderal Bina Produksi Kehutanan (Directorate General of Forestry Production Management), Ministry of Forestry, Jakarta.

Dishut Provinsi NTB, 2009. Rencana aksi NTB hijau: Mengembangkan perencanaan berbasis wilayah, (Action plan for green NTB: Integrated areas-based development planning), Dishut Provinsi NTB (Dinas Kehutanan Provinsi Nusa Tenggara Barat) (Provincial Forestry Agency West Nusa Tenggara), Mataram.

Djamhuri, T. L., 2008. Community participation in a social forestry program in Central Java, Indonesia: the effect on incentive structure and social capital, Agroforestry Systems, 74: 83-96.

Donovan, J., Stoian, D. and Macqueen, D., 2006. The busines side of sustainable forest management: Small and medium forest enterprise development for poverty reduction, Natural Resource Perspective, 104(December): 1-6.

Dore, M. H. I., 1999. The economics of well-being: A review of post welfarist economics, In Global environmental economics: Equity and the limits to markets, (Eds, Dore, M. H. I. and Mount, T. D.), Blackwell Publishers, Maden and Oxford.

Dore, M. H. I. and Mount, T. D., 1999. Global environmental economics, Equity and the limits to markets, Blackwell Publishers, Malden and Oxford

Duguma, L. A., 2013. Financial analysis of agroforestry land uses and its implications for smallholder farmers livelihood improvement in Ethiopia, Agroforestry Systems, 87(1): 217-231. Available from: <Go to ISI>://WOS:000314270400018 (accessed 23/03/2014).

Duinker, P. N. and Greig, L. A., 2007. Scenario analysis in environmental impact assessment: Improving explorations of the future, Environmental Impact Assessment Review, 27: 206-219. Available from: DOI:10.1016/j/eiar2006.11.001 (accessed 24/03/2010).

Dunning, G., 2007. The potential of commercial forestry to reduce poverty, In A cut for the poor, Proceedings of the international conference on managing forests for poverty reduction: Capturing opportunities in forest harvesting and wood processing for the benefit of the poor. Ho Chi Minh City, Viet Nam, 3-6 October 2006. FAO RAP publication number and RECOFT Report No. 19 (Eds, Oberndorf, R., Durst, P., Mahanty, S., Burslem, K. and Suzuki, R.), FAO and RECOFT, Bangkok, pp. 19-24.

Durst, P. B., 2007. Statement by Partick B. Durst, Senior Forestry Officer, Regional Office for the Pacific Food and Agriculture Organization of the United Nations In A cut for the poor. Proceedings of the International Conference on Managing Forests for Poverty Reduction: Capturing opportunities in forest harvesting and wood processing for the benefit of the poor. Ho Chi Minh City, Vietnam 3-6 October 2006, (Eds, Oberndorf, R., Durst, P., Mahanty, S., Burslem, K. and Suzuki, R.), FAO and RECOFT, Bangkok.

Eisenhardt, K. M., 1989. Building theories from case study research, The Academy of Management Review, 14(4): 532-550. Available from: http://www.jstor.org/stable/pdfplus/258557.pdf (accessed 15/04/2010).

eksposnews.com, 2012. Harga membuat petani sawit jadi miskin (Price has made oil palm farmers poor). Available from: http://eksposnews.com/view/11/43466/Harga-Membuat-Petani-Sawit-Jadi-Miskin.html (accessed 14/11/2012).

Emtage, N. F. 2004. An investigation of the social and economic factors affecting the development of small-scale forestry by rural households in Leyte Province, Philippines: A typology of rural households in relation to small-scale forestry. PhD Thesis, University of Queensland.

Enters, T., Durst, P. B. and Brown, C., 2003. What does it take to promote forest plantation development? Incentives for tree-growing in countries of the Pacific Rim Unasylva, 54(212): 11-18.

Enters, T., Durst, P. B., Brown, C., Carle, J. and McKenzie, P., 2004. What does it take? The role of incentives in forest plantation development in Asia and the Pacific. Executive summary, RAP Publication 2004/28, Asia-Pacific Forestry Commission, Food and Agriculture Organization of the United Nations, Regional office for Asia and the Pacific, Bangkok. Available from: ftp://ftp.fao.org/docrep/fao/007/ad524e/ad524e00.pdf (accessed 16/01/2008).

Equilibrium, 1996. Sanggau and Sintang Timber Estate, West Kalimantan: An environmental, cultural, and economic assessment of a pulp plantation, A study for Enso Forest Development Oy, Bristol.

European Environment Agency, 2005. Market-based instruments for environmental policy in Europe. EEA Technical report No. 8/2005, Copenhagen, Denmark.

FAO, 1985. Forestry paper 64: Tree growing by rural people, FAO (Food and Agriculture Organization of The United Nations), Rome. Available from: http://www.fao.org/docrep/x5861e/x5861e00.htm#Contents (accessed 17/08/2009).

FAO, 1999. Incentive systems for natural resource management, Environmental Report Series 2, FAO Investment Centre, Food and Agriculture Organization of the United Nations, Rome. Available from: ftp://ftp.fao.org/docrep/fao/007/x2247e/x2247e00.pdf (accessed 08/09/2009).

FAO, 2001. Global Forest Resources Assessment 2000 - Main Report, FAO Forestry Paper No. 140, Food and Agriculture Organization of the United Nations, Rome.

FAO, 2002. Land tenure and rural development, FAO Land tenure studies 3, Food and Agriculture Organization of the United Nations, Rome. Available from: ftp://ftp.fao.org/docrep/fao/005/y4307E/y4307E00.pdf (accessed 1 September 2008).

FAO, 2003. State of the world's forest 2003, Food and Agriculture Organization of the United Nations, Rome, Italy.

FAO, 2006. Global planted forest thematic study: results and analysis (By A. Del Lungo, J. Ball and J. Carle), Planted Forests and Trees Working Paper FP/38, Food and Agriculture Organization of the United Nations, Rome. Available from: http://www.fao.org/forestry/fra/38995/en/ (accessed 14/01/2008).

FAO, 2006a. Global Forest Resources Assessment 2005 - progress towards sustainable forestry management, FAO Forestry Paper No. 147, Rome. Available from: ftp://ftp.fao.org/docrep/fao/008/A0400E/A0400E00.pdf) (accessed 15/01/2008).

FAO, 2009. State of the World's Forests 2009, Food and Agriculture Organization of the United Nations, Rome. Available from: http://www.fao.org/docrep/011/i0350e/i0350e00.HTM (accessed 07/04/2009).

FAO, 2012. State of the World's Forests 2012, Food and Agriculture Organization of the United Nations, Rome. Available from: http://www.fao.org/docrep/011/i0350e/i0350e00.HTM (accessed 07/04/2009).

Fathullah, Situmorang, L., Cahyaningsih, N., Nuch, I. and Sirait, M., 2005. Perubahan satus kawasan hutan guna menjawab permasalahan kemiskinan dan ketahanan pangan: Studi kasus dari Marga Bengkunat dan Pekon Sukapura, Kabupaten Lampung Bara (Changes in the status of forest area to the problem of poverty and food security: Case studies from Marga Bengkunat and Pekon Sukapura, West Lampung District), In Tanah masih di langit, penyelesaian masalah penguasaan tanah dan kekayaan alam di Indonesia yang tak kunjung tuntas di Era Reformasi (Land is still on the sky, unresolved issues on land tenure and the wealth of nature in Indonesia during the Reformation Era), Yayasan Kemala, Jakarta, pp. 619-630.

FI, 2006a. Konsep dasar 'Pola Kemitraan' model pembangunan HTI PT. Finnantara Intiga, (The basic concept of 'partnership scheme' model for industrial forestry plantations development in PT. Finnantara Intiga, FI (Finnantara Intiga), Sanggau.

FI, 2006b. Perjanjian Kerjasama Penggunaan Lahan, (Partnership agreement on land utilisation), FI (Finnantara Intiga), Sinarmas Forestry, Pontianak.

FI, 2008. Pembangunan Hutan Tanaman Lestari PT. Finnantara Intiga, Kalimantan Barat, (The development of sustainable forestry plantations of Finnantara Intiga, West Kalimantan) PT FI (Finnantara Intiga), Sinarmas Forestry, Pontianak.

Fikar, S., 2003. PT Finnantara Intiga's outgrower scheme: Hutan Tanaman Industri (HTI) plantation establishment :"Integrated HTI model", In Equitable partnerships between corporate and smallholder partners: relating partnerships to social, economic and environmental indicators. Proceeding of CIFOR and FAO Workshop, Bogor, 21-23 May 2002, (Eds, Nawir, A. A., Anyonge, C. H., Race, D. and Vermeulen, S.), FAO (Food and Agriculture Organization of The United Nations) and CIFOR (Center for International Forestry Research) Bogor, pp. 147-152.

FLEGT, 2010. Laporan hasil evaluasi pelaksanaan legalitas kayu rakyat melalui pemberlakuan Surat Keterangan Asal Usul (SKAU) Provinsi Jambi (Evaluation report on the implementation of the verification of community timber legality under the implementation of growth originality certificate in Province of Jambi), EC-Indonesia FLEGT Support Project (AIDCO/2004/16830), Jambi.

Flyvberg, B., 2004. Five misunderstanding about case-study research, In Qualitative Research Practice, (Eds, Seale, C., Gobo, G., Gubrium, J. F. and Silverman, D.), Sage, London and Thousand Oaks, CA, pp. 420-434.

FORDA, 2006. Tabel volume untuk Jati berdasarkan Bonita (The volume table for teak based on Bonita), FORDA (Forestry Research and Development Agency), Ministry of Forestry, Bogor.

FORDA, CIFOR and WWF Indonesia, 2007. Workshop skenario kemitraan pengelolaan hutan rakyat di Kabupaten Bulukumba (Workshop on partnership scenario for farm forestry management in Bulukumba District), 20-21 June 2007, FORDA (Forestry Research and Development Agency), CIFOR (Center for International Forestry Research), and WWF (World Wide Fund for Nature) Indonesia, Bulukumba.

FORKOD HKm NTB & PKSK Unram, 2001. Studi dampak keberhasilan Program HKm di Prop. NTB (Impact study on the successful HKm Programme in West Nusa Tenggara Province), Laporan akhir (Final report), FORKOD HKm NTB -Forum Komunikasi Hutan Kemasyarakatan Propinsi Nusa Tenggara Barat (Communication forum on community forestry in West Nusa Tenggara Province) and PKSK Unram - Pusat Kajian Sumberdaya Kehutanan) Fakultas Pertanian Universitas Mataram (Research Cntre on Forestry Resources, Agricultural Faculty of Mataram University), Mataram.

Fortman, L., 1985. The tree tenure factor in agroforestry with particular reference to Africa, Agroforestry Systems, 2(4): 229-251. Available from: http://www.springerlink.com/content/q2px210m02165173/ (accessed 04/09/2009).

Foundjem-Tita, D., Tchoundjeu, Z., Speelman, S., D'Haese, M., Degrande, A., Asaah, E., Huylenbroeck, G., Damme, P. and Ndoye, O., 2013. Policy and Legal Frameworks Governing Trees: Incentives or Disincentives for Smallholder Tree Planting Decisions in Cameroon?, Small-Scale Forestry, 12(3): 489-505. Available from: http://dx.doi.org/10.1007/s11842-012-9225-z (accessed 23/03/2014).

Fuad, F. H. a. R. A. S., 2000. Sertifikasi hutan Perum Perhutani: Insentif bagi Sustainable Forest Management, sekedar hadiah, atau blunder? Forest certification in Perhutani: Incentive for Sustainable Forest Management, gift or blunder?, Position Paper, ARuPA, Yogjakarta.

Fujiwara, T., Septiana, R. M., Awang, S. A., Widayanti, W. T., Bariatul, H., Hyakumura, K. and Sato, N., 2012. Changes in local social economy and forest management through the introduction of collaborative forest management (PHBM), and the challenges it poses on equitable partnership: A case study of KPH Pemalang, Central Java, Indonesia, Tropics, 20(4): 115-134.

FWI, 2009. Pemerintah diminta menghentikan ekspansi industri pulp dan menghentikan pasokan kayu dari hutan alam untuk industri pulp (Government is expected to stop the expansion of the pulp industries and the wood supply coming from natural forest for these industries), Press release, 19 March 2009, FWI (Forest Watch Indonesia), Jakarta.

Galal, G. H. and Paul, R. J., 1999. A qualitative scenario approach to managing evolving requirements, Requirements Enginering, 4: 92-102. Available from: http://www.springerlink.com/content/4k37rlpk83ke877u/fulltext.pdf (accessed 14/04/2010).

Garforth, M., Landell-Mills, N. and Mayers, J., 2005. Plantations, Livelihoods and Poverty, In Plantations, privatization, poverty and power. Changing ownership and management of state forest, (Eds, Garforth, M. and Mayers, J.), Earthscan, London, Sterling, VA.

Geilfus, F., 1997/98. From 'Tree-haters' to Tree-farmers: Promoting Farm Forestry in the Dominican Republic, Network Paper 22d, Rural Development Forestry Network ODI.

Gerber, J.-F., 2011. Conflicts over industrial tree plantations in the South: Who, how and why?, Global environmental change, 21: 165-176.

Gilmour, D. A., 1997. Rearranging trees in the landscape in the Middle Hills of Nepal, In Patterns of tree growing by farmers in eastern Africa, (Eds, Arnold, J. E. M. and Dewees, P. A.), Earthscan, London.

Gintings, A. N., Sutigno, P., Rohadi, D., Susilo, A., Nulhakim, L. and Hediana, C., 2001. Diskusi teknologi pemanfaatan kayu budidaya untuk mendukung industri perkayuan yang berkelanjutan (Discussion on technology on wood utilisation to support sustainable wood industries), Pusat Penelitian dan Pengembangan Teknologi Hasil Hutan (Research and Development Center for Forest Products Technology). Forest Research and Development Agency, MoF.

Godet, M., 2000. The art of scenarios and strategic planning: Tools and pitfalls, Technological Forecasting and Social Change, 65(1): 3-22. Available from: <Go to ISI>://CCC:000089845600002 - http://www.elsevier.nl (accessed 14/04/2010).

Godoy, R., 1992a. Some Organizing Principles in the Valuation of Tropical Forests, Forest Ecology and Management, 50(1-2): 171-180. Available from: <Go to ISI>://A1992JG91100012 (accessed

Godoy, R. A., 1992b. Determinants of smallholder commercial tree cultivation, World Development, 20(5): 713-725. Available from: http://www.sciencedirect.com/science?_ob=PublicationURL&_tockey=%23TOC%235946%231992%23999799994%23291265%23FLP%23&_cdi=5946&_pubType=J&_auth=y&_acct=C000028338&_version=1&_urlVersion=0&_userid=554534&md5=58d9a24b52dc7f9adf59be8fba87e656 (accessed 05/08/2009).

GoI, 1999. Peraturan Pemerintah Republik Indonesia Nomor 74 tahun 1999 tentang perubahan atas Peraturan Pemerintah Nomor 59 Tahun 1998 tentang Tarif atas Jenis Penerimaan Negara Bukan Pajak yang berlaku pada Departemen Kehutanan dan Perkebunan (Government Regulation No. 74, 1999 on the changes regarding Government Regulation No. 59 on tariff on government revenues from non taxes government revenues implemented in Ministry of Forestry and Estate Crops) GOI (The Government of Indonesia), Jakarta.

GoI, 2007. Peraturan Pemerintah (PP) No. 6 Tahun 2007 tentang Tata Hutan dan Penyusunan Rencana Pengelolaan Hutan serta Pemanfaatan Hutan (Government Regulation No. 6 Tahun 2007 on planning proposal for forest management and forest utilisation) GOI (The Government of Indonesia), Jakarta.

Gowdy, J., 2005. Toward a new welfare economics for sustainability, Ecological Economics, 53(2): 211-222. Available from: <Go to ISI>://CCC:000229274400005 - http://www.elsevier.com (accessed 27/05/2009).

Greenomics, 2004a. Evolusi mekanisme perizinan usaha pemanfaatan hasil hutan kayu pada hutan alam dan hutan tanaman, Kertas Kerja No. 06 (Working Paper No. 06) Greenomics Indonesia, Jakarta. Available from: http://www.greenomics.org/docs/wp06.pdf (accessed 22/10/2010).

Greenomics, 2004b. Industri pengolahan kayu: Evolusi terhadap mekanisme perizinan, kewenangan, dan pembinaan industri pengolahan kayu (Wood processing industries: Evolution to mechanism for obatining the permits, authorisation, and the development of wood processing industries) Kertas Kerja 08 (Working Paper 08) Greenomics Indonesia, Jakarta. Available from: http://www.greenomics.org/docs/wp08.pdf (accessed 22/10/2010).

Gregersen, H., Oram, P. and Spears, J. (Eds.), 1992. Priorities for forestry and agroforestry policy research: report on an international workshop, International Food Policy Research Institute, Washington.

Groom, B., Hepburn, C., Koundouri, P. and Pearce, D., 2005. Declining discount rates: The long and the short of it, Environmental & Resource Economics, 32(4): 445-493. Available from: <Go to ISI>://CCC:000233721900002 (accessed 16/04/2008).

Guess, G. M., 2005. Comparative decentralization lessons from Pakistan, Indonesia and the Philippines, Public Administration Review, 65(2): 217-230. Available from: http://www3.interscience.wiley.com/cgi-bin/fulltext/118688467/PDFSTART (accessed 10/11/08).

Guisan, A., Thomas C. Edwards, J. and Hastie, T., 2002. Generalized linear and generalized additive models in studies of species distrbutions: setting the scene, Ecological Modelling, 157: 89-100.

Gunung Kidul District Government, 2006. Idealitas pelaksanaan dan pengembangan Gerhan standar otonomi daerah (Ideal conditions for implementing and developing national forest rehabilitation program under regional autonomy standards), Power point material.

Handadhari, T., 2001. Episode Pengelolaan Hutan yang Makin Suram (The episode of doomed forest mangement), In Kompas 16 February 2001, pp. 28.

Harada, K. and Wiyono, 2014. Certification of a community-based forest enterprise for improving institutional management and household income: A case from Southeast Sulawesi, Indonesia Small-Scale Forestry, 13: 47-64.

Harrison, S., 2005. Economic theory perspectives on timber market behaviour in a small but expanding industry, In Smallholder Forestry Project - Improving Financial Returns to Smallholder Tree Farmers in the Philippines, 15-17

Febuary, 2005 (Ed, Suh, J. a. H., Steve R. and Herbohn, John L. and Mangaoang, Eduardo O. and Vanclay, Jerry), Ormoc City, the Philippines, pp. 39-48.

Harrison, S. and Herbohn, J., 2001. Socio-economic evaluation of the potential for Australian tree species in the Philippines, ACIAR Monograph 75, Australian Center for International Agricultural Research (ACIAR), Canberra.

Harrison, S., Herbohn, J. and Niskanen, A., 2002. Non-industrial, Smallholder, Small-scale and Family Forestry: What's in a Name?, Small-scale Forest Economics, Management and Policy, 1(1): 1-11.

Harrison, S. and Suh, J., 2004. Progress and prospect of community forestry in developing and developed countries, Small-scale Forest Economics, Management and Policy, 3(3): 287-302.

Harrison, S. R., Suh, J., Mangaoang, E. O., Bulayog, B., S. and Herbohn, J. L., 2005. Modelling timber supply and demand associated with existing tree farms within Leyte including external markets, In Smallholder Forestry Project - Improving Financial Returns to Smallholder Tree Farmers in the Philippines, 15-17 Febuary, 2005, (Eds, Suh, J., Harrison, S. R., Herbohn, J. L., Mangaoang, E. O. and Vanclay, J.), Ormoc City, pp. 87-94

Hastie, T. and Source, R. T., 1986. Generalized Additive Models, Statistical Science, 1 (3): 297-310. Available from: http://www.jstor.org/stable/2245459 (accessed 07/04/2010).

Hepburn, C. J. and Koundouri, P., 2007. Recent advances in discounting: Implications for forest economics, Journal of Forest Economics, 13(2-3): 169-189. Available from: http://www.elsevier.com (accessed 13/03/2008).

Herbohn, J. 2006 Small-scale forestry - Is it simply a smaller version of industrial (large-scale) multiple use forestry?, Proceeding of IUFRO Conference hosted by Galway-Mayo Institute of Technology, Small-scale forestry and rural development - The intersection of ecosystems, economics and society, 18-23 June 2006. Galway, Ireland. National Council for Forest Research and Development (COFORD). Available from: https://www.coford.ie/iopen24/pub/pub/Books-pdf/iufro-06/Herbohn.pdf (accessed 16/01/2008).

Herbohn, J. L., Vanclay, J., Nguyen, H., Le, H. D., Baynes, J., Harrison, S. R., Cedamon, E., Smith, C., Firn, J., Gregorio, N. O., Mangaoang, E. and Lamarre, E., 2014. Inventory procedures for smallholder and community woodlots in the Philippines: Methods, initial findings and insights, Small-Scale Forestry, 13: 79-100.

Herbohn, J. L. a. T., David and Emtage, Nick F. and Harrison, Steve R., 2002. The Design and Structure of the Australian Farm Forestry Financial Model. , In A report for the RIRDC/Land & Water Australia/FWPRDC: Joint Venture Agroforestry Program. July 2002., (Eds, Harrison, S. and Herbohn, J.), The University of Queensland, Brisbane, Australia.

Hernandez, F., Urkiaga, A., De las Fuentes, L., Bis, B., Chiru, E., Balazs, B. and Wintgens, T., 2006. Feasibility studies for water reuse projects: an economical approach, Desalination, 187(1-3): 253-261. Available from: <Go to ISI>://CCC:000235585000024 (accessed 09/06/2009).

Hillebrand, B., Kok, R. A. W. and Biemans, W. G., 2001. Theory-testing using case studies: A comment on Johnston, Leach, and Liu Industrial Marketing Management, Volume 30(Issue 8): 651-657 Available from: http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V69-447D2WW-5&_user=554534&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000028338&_version=1&_urlVersion=0&_userid=554534&md5=3f815eba1714b4a54cb6787ab7419a59 (accessed 11/05/2009).

Hindra, B., 2005. Indonesia community forestry 2005, Community forestry status report, First Regional Community Forestry Forum RECOFT, Bangkok. Available from: http://www.recoftc.org/site/fileadmin/docs/publications/The_Grey_Zone/2006/CF_Forum/policy_indo.pdf (accessed 28/04/2009).

Hindra, B., 2006. Potensi dan kelembagaan hutan rakyat (The farm forestry prospective and institutions), Proceeding of research results seminar organised by Forestry Research and Development Agency (FORDA) Ministry of Forestry (MoF), the Government of Indonesia, Bogor. Available from: http://www.dephut.go.id/files/Pot_Klbg_HR.pdf (accessed 30/04/2009).

Hindra, B., 2007. Community forestry in Indonesia, Power point presentation at the Asia Pacific Tropical Forest Investment Forum, 6-8 August, Bangkok. Available from: www.itto.int/direct/topics/topics_pdf_download/topics_id=32890000&no=61 (accessed 28/04/2009).

Hlaing, E., Inoue, M. and Pulhin, J., 2013. A Property-Rights Approach to Understanding Regulations and Practices in Community-Based Forest Management: Comparison of Three Systems in the Philippines, Small-Scale Forestry, 12(4): 579-596. Available from: http://dx.doi.org/10.1007/s11842-012-9232-0 (accessed 23/03/2014).

HM Treasury, 2003. The Green Book: Appraisal and evaluation in central government, London. Available from: hhtp://www.hm-treasury.gov.uk/d/green_book_complete.pdf (accessed 11/03/2009).

Hoch, L., Pokorny, B. and de Jong, W., 2012. Financial attractiveness of smallholder tree plantations in the Amazon: bridging external expectations and local realities, Agroforestry Systems, 84(3): 361-375. Available from: <Go to ISI>://WOS:000301241700004 (accessed 23/03/2014).

Holloway, G., Nicholson, C., Delgado, C., Staal, S. and Ehui, S., 2000. Agroindustrialization through institutional innovation: transaction costs, cooperatives, and milk-market development in the east-African highlands, Agricultural Economics, 32(3): 279-288. Available from: http://www.sciencedirect.com/science/journal/01695150 (accessed

Humas NTB, 2011. NTB terpilih sebagai tuan rumah workshop 'Internasional Conference on Forest Tenure' (NTB is chosen as the host of the International Conference on Forest Tenure), Pemerintah Provinsi Nusa Tenggara Barat (The Provincial Government of West Nusa Tenggara), Mataram. Available from: http://www.ntbprov.go.id/baca.php?berita=558 (accessed 11/11/2012).

Iman, U. M. M. N. 2000. Konflik antara masyarakat lokal dengan perusahaan Hutan Tanaman Industri: Studi kasus masyarakat Desa Mentulik dan PT Rimba Seraya Utama, Kabupaten Kampar, Riau (Conflicts between local community and industrial timber plantation company: Case study on community of Mentulik Village and company of Rimba Seraya Utama, Kampar District, Riau). Bachelor Degree Thesis, Institut Pertanian Bagor (Bogor Agricultural Institute).

IMF, 2010. World economic outlook database October, IMF (International Monetary Fund) Available from: http://www.imf.org/ (accessed 11/11/2010).

Ince, P., Akim, E., Lombard, B., Parik, T. and Tolmatsova, A., 2011. Chapter 8, Paper, paperboard and woodpulp markets, 2010-2011, In Forest Products Annual Market Review, 2010-2011, Geneva Timber and Forest Study Paper 27, UNECE (United Nations Economic Commission for Europe)/FAO (Food and Agriculture Organization of the United Nations), Geneva.

Indonesian Working Group on Forest Finance, 2010. Perkiraan penggunaan sumber bahan baku industri pulp & paper (Estimation on raw material uses for pulp and paper industries), Studi advokasi: PT RAPP and PT IKPP di Propinsi Riau (Advocacy study: RAPP and IKPP Companies in Riau Province), Indonesian Working Group on Forest Finance, Jakarta.

Indrarto, G. B., Murharjanti, Prayekti, Khatarina, J., Pulungan, I., Ivalerina, F., Rahman, J., Prana, M. N., Pradnja, R. I. A. and Muharrom, E., 2012 The context of REDD+ in Indonesia: Drivers, agents and institutions Cennter for International Forestry Research (CIFOR) Bogor.

Irawan, S., Taconni, L. and Ring, I., 2013. Stakeholders' incentives for land-use change and REDD+: The case of Indonesia, Ecological Economics, 87: 75-83.

Irland, L. C., 2010. State failure and corruption: challenges for forest policy, ITTO Tropical Forest Update 19/1, ITTO (International Tropical Timber Organization), Yokohama.

ITTO, 1998-2009. Tropical Timber Market Report Vol. 16-31 October 1998 - Vol 14, No. 20, 16-31 October 2009, ITTO (International Tropical Timber Organization), Yokohama.

ITTO, 2007. Annual review and assessment of the world timber situation, ITTO (International Tropical Timber Organization), Yokohama, Japan. Available from: http://www.itto.int/en/annual_review/ (accessed 23/04/2009).

ITTO, 2011. Annual review and assessment of the world timber situation 2011, ITTO (International Tropical Timber Organization), Yokohama, Japan. Available from: http://www.itto.int/annual_review/ (accessed 31/10/2012).

IUCN 1996. Resolutions and recommendations, World Conservation Congress, Montreal (Canada), 13-23 October, 1996. IUCN (The World Conservation Union). Available from: http://data.iucn.org/dbtw-wpd/edocs/WCC-1st-002.pdf (accessed 07/11/08).

Jabir, M. and Julmansyah, 2003. Mewujudkan produk hukum partisipatoris: Upaya membingkai kembali proses-proses sosial komunitas, In Dari pemerintah ke rakyat: Distribusi kewenangan pengelolaan hutan. Inisiatif Perda PSDHBM Kabupaten Sumbawa, Propinsi NTB (From government to the people: Distribution of authority on forest management. PSDHBM initiative of Sumbawa District Government, NTB Province) (Eds, Putro, W. D., Suryadi, S., Sabani, R., Julmansyah, Taqiuddin, Jabir, M. and Suharto), LP3ES, DFID, DPRD Sumbawa, Jakarta, pp. 68-86.

Jaffee, D., 1995. Confronting globalization in the community forests of Michoacán, Mexico: Free trade, neoliberal reforms, and resource degradation, Institute for Environmental Studies, Madison. Available from: http://lasa.international.pitt.edu/LASA97/jaffee.pdf (accessed 17/07/2009).

Jariyah, N. A. and Wahyuningrum, N., 2008. Karakteristik hutan rakyat di Jawa (Characteristics of private forest in Java), Jurnal Penelitian Sosial dan Ekonomi Kehutanan (Journal of Forestry Socioeconomic Research), 5(1): 43-56.

Jarke, M., Bui, X. T. and Carroll, J. M., 1998. Scenario management: an interdiciplinary approach, Requirements Enginering, 3: 155-173.

Jick, T., 1979. Mixing qualitative and quantitative methods: triangulation in action Administrative Science Quarterly, 24: 602-611.

Johnston, W. J., Leach, M. P. and Liu, A. H., 1999. Theory testing using case studies in business-to-business research, Industrial Marketing Management, 28(3): 201–213. Available from: http://www.sciencedirect.com/science?_ob=PublicationURL&_tockey=%23TOC%235809%231999%23999719996%2386688%23FLA%23&_cdi=5809&_pubType=J&_auth=y&_acct=C000028338&_version=1&_urlVersion=0&_userid=554534&md5=548b91b75c65622749c1702abc4d8d10 (accessed 15/05/2009).

Julmansyah, 2005. Catatan pertemuan verifikasi tingkat desa hasil penelitian tentang bagi hasil pengelolaan hutan bersama masyarakat di Kabupaten Sumbawa (Notes on verification process at village level on the results from study on mutually beneficial-benefit sharing arrangement in developing community forestry plantation in Sumbawa District), 25-26 May 2005, Dinas Kehutanan dan Perkebunan Sumbawa (Forestry and Estate Crops District Agency of Sumbawa), Sumbawa.

Julmansyah, 2006. Pelembagaan kehutanan multipihak (Institutionalising multi-stakeholders in forest management) In Kehutanan multipihak: Langkah menuju perubahan (Multi-stakeholders approach in forest management: Towards new changes), (Eds, Yuliani, E. L., Tadjudin, D., Indriatmoko, Y., Munggoro, D. W., Gaban, F. and Maulana, F.), CIFOR (Center for International Forestry Research), Bogor, pp. 70-80.

Julmansyah, Heriwibowo, D., Herawati, Jufrie, Yani, A., Syafruddin, Nawir, A. A., Trison, S. and Hakim, M. R., 2005. Studi mengenai bagi hasil yang menguntugkan dalam pengembangan kemitraan hutan tanaman kayu masyarakat di Kabupaten Sumbawa (Study on mutually beneficial benefit-sharing arrangement in developing community forestry plantation in Sumbawa District), Bahan pleno multipihak tingkat kabupaten di Kabupaten Sumbawa (Paper for multistakeholder workshop in Sumbawa District), CIFOR (Center for International Forestry Research). WWF (World Wide Fund for Nature) Indonesia, and Dinas Kehutan dan Perkebunan Sumbawa (Forestry and Estate Crops District Agency of Sumbawa), Sumbawa.

Jurgens, E., 2008. A brief financial analysis of pulpwood production in Indonesia (Draft for review). Prepared for CIFOR and the World Bank, CIFOR (Center for International Forestry Research), Bogor.

Jurgens, E., Barr, C. and Cossalter, C., 2005. Brief on the planned United Fiber System (UFS) Pulp Mill Project for South Kalimantan, Indonesia, CIFOR and Forest Trends, CIFOR (Center for International Forestry Research), Bogor.

Kaban, M. S., 2009. Hutan untuk hutan, hutan untuk manusia (Forest for forest, forest for people). Article written by the Minister of Forestry in Harian Tempo, Selasa 23 Juni 2009 (Tempo newspaper, Tuesday, 23 June 2009), Tempo newspaper, Tempo, Jakarta.

Kalleberg, A. L., 1966. The logic of comparison: A methodological note on the comparative study of political systems, World Politics, 19(1 (October)): 69-82 Available from: http://www.jstor.org/stable/2009843 (accessed 31/03/2010).

Kang, D. C.-o. 1996. Profits of doom: Transaction costs, rent-seeking, and development in South Korea and the Philippines. PhD Thesis, UMI Dissertation Services (A Bell & Howell Company), University of California, Berkeley.

Kaosa-ard, A., 1998. Management of teak plantations, In Teak for the future, Proceedings of the second regional seminar on teak, 29 May - 3 June 1995, Yangon, Myanmar, RAP Publication 1998/5, (Eds, Kashio, M. and White, K.), FAO Regional Office for Asia and the Pacific (RAP).

Kartodihardjo, H., 2010. Hutan Rakyat: Masalah penelitian kebijakan dan kritik penelitian (Farm forestry: policy research problem and critics), Beberapa catatan kunci bagi pelaksanaan Seminar 'Peningkatan produktivitas Hutan Rakyat untuk kesejahteraan masyarakat' (Key notes for the seminar on improving the productivity of farm forestry for community welfare), 20 October 2010, Bandung.

Kartodihardjo, H. and Supriono, A., 2000. The Impact of Sectoral Development on Natural Forest Conversion and Degradation: The Case of Timber and Tree

Crop Plantations in Indonesia, Occasional Paper No. 26(E), Center for International Forestry Research (CIFOR), Bogor.

King, K. F. S. and Chandler, M. T., 1978. The wasted lands: the programme of work of the International Council for Research In Agroforestry, ICRAF, Nairobi.

Klemperer, W. D., 1996. Forest resource economics and finance, McGraw Hill, New York.

Krisnawati, H. 2007. Modelling stand growth and yield for optimizing management of Acacia mangium plantations in Indonesia. PhD Thesis, The University of Melbourne, Australia.

Krisnawati, H., Kallio, M. and Kanninen, M., 2011. Acacia mangium Wild.: ecology, silviculture and productivity, CIFOR (Center for International Forestry Research), Bogor.

Kula, E., 1988. The economics of forestry, Modern theory and Practice, Croom Helm & Timber Press, London, Sydney, and Portland.

Kumar, S., 2002. Does "participation" in common pool resource management help the poor? A social cost-benefit analysis of joint forest management in Jharkhand, India, World Development, 30(5): 763-782. Available from: <Go to ISI>://CCC:000175603700003 (accessed 13/08/2008).

Kurniawan, I., Roshetko, J. and Anggakusuma, D., 2008. Community teak wood marketing in Gunung Kidul District, Yogyakarta Province: Current practice, problems and opportunities, ACIAR Project Report, ACIAR (Australian Centre for International Agricultural Research), ICRAF (World Agroforestry Centre), adn WI (Winrock International), Bogor.

Kusumedi, P., Suwarno, A., Nawir, A. A. and Rizal, A., 2007. Modeling untuk penyusunan skenario kemitraan dalam pengelolaan hutan rakyat di Kabupaten Bulukumba, Sulawesi Selatan (Modelling for developing partnership scenario for farm forestry management in Bulukumba District), Laporan kegiatan Proyek ACIAR (ACIAR Project Activity Report), CIFOR (Center for International Forestry Research), FORDA (Forestry Research and Development Agency), and ACIAR (Australian Centre for International Agricultural Research), Bogor.

Lamb, D. and Tomlinson, M., 1994. Forest rehabilitation in the Asia-Pacific Region: Past lessons and presents uncertainties, Journal of Tropical Forest Science, 7(1): 157-170.

Lang, C., 2010. EU Ecolabel allows forest destruction: The case of Pindo Deli, FERN Tracking EU Policies, Focussing on forests, Bruxelles and Gloucestershire.

Lintott, J., 1998. Beyond the economics of more: the place of consumption in ecological economics, Ecological Economics, 25(3): 239-248. Available from: http://www.elsevier.com (accessed 27/05/2009).

Long, A. J. and Nair, P. K. R., 1999. Trees outside forests: agro-, community, and urban forestry, New Forests, 17(1-3): 145-174. Available from: <Go to ISI>://CCC:000081190300013 (accessed 21/08/2009).

Luoga, E. J., Witkowski, E. T. F. and Balkwill, K., 2000. Economics of charcoal production in miombo woodlands of eastern Tanzania: some hidden costs associated with commercialization of the resources, Ecological Economics, 35(2): 243-257.

Macqueen, D., 2001. Common problems for the forest-dependent poor: Results from 22 countries, FRP (Forestry Research Programme) and NRI (Natural Resources International) Ltd, Chatham.

Macqueen, D., 2013. Enabling Conditions for Successful Community Forest Enterprises, Small-Scale Forestry, 12(1): 145-163. Available from: http://dx.doi.org/10.1007/s11842-011-9193-8 (accessed 23/04/2014).

Macqueen, D. J., 2007. Connecting small enterprises in ways that enhance the lives of forest-dependent people, Unasylva, 58(228 2007/3): 26-30. Available from: ftp://ftp.fao.org/docrep/fao/010/a1346e/a1346e14.pdf (accessed 08/01/2008).

Makhija, M., 2003. Comparing the resource-based and market-based views of the firm: Empirical evidence from Czech privatization, Strategic Management Journal, 24(5): 433-451. Available from: <Go to ISI>://CCC:000182114000003 (accessed 26/05/2009).

Manurung, E. G. T., 2009. Revitalisasi industri kehutanan era pengelolaan hutan berkelanjutan (Revitalising the forest industry within the era of sustainable forest management), Bahan presentasi workshop strategi pengelolaan hutan produksi berkelanjutan mendukung kebijakan baru pengelolaan hutan di Provinsi Papua, Jayapura, 24 Maret 2009 (Power point presentation for workshop on strategy for sustainable management of production forest in supporting the new forest management policy in the Province of Papua, Jayapura, 24 March 2009), Jayapura.

Mather, A. S., 1992. The Forest Transition, Area, 24(4): 367-379. Available from: http://www.jstor.org/stable/20003181 (accessed 26/05/2014).

Matose, F., 2006. Co-management options for reserved forests in Zimbabwe and beyond: Policy implications of forest management strategies, Forest Policy and Economics, 8: 363-374.

Maturana, J., Hosgood, N. and Suhartanto, A. A., 2005. Moving towards company-community partnerships: elements to take into account for fast-wood plantation companies in Indonesia, CIFOR Working Paper No. 29, Center for International Forestry Research (CIFOR), Bogor.

Mayers, J., 2000. Company-community forestry partnerships: a growing phenomenon, Unasylva 200, 51: 33-41.

Mayers, J., 2006. Poverty reduction through commercial forestry. What evidence? What prospects? , The Forest Dialogue. Research Paper. A TFD Publication Number 2., Yale University, School of Forestry and Environmental Studies.

Mayers, J. and Vermeulen, S., 2002. Company-community forestry partnerships: From raw deals to mutual gains? Instruments for sustainable private sector forestry series, International Institute for Environment and Development, London.

Mbile, P., Pa'ah, P.-A., Popoola, L. and Ndzomo-Abanda, G., 2007. Towards a holistic community forest enterprise model: Case of the agroforestry cooperative of the Tri-National (CAFT), Southeast Cameroon World Agroforestry Centre (ICRAF), Department of Ecological and Environmental Anthropology, University of Georgia, and Tropical Resource Institute, School of Forestry and Environmental Studies, Yale University.

McCarthy, J. F., Gillespie, P. and Zen, Z., 2012. Swimming Upstream: Local Indonesian Production Networks in "Globalized" Palm Oil Production, World Development, 40(3): 555-569. Available from: <Go to ISI>://WOS:000300869600010 (accessed 26/03/14).

McClintock, A. and Griffith, G., 2010. Benefit-cost meta analysis of investment in the International Agricultural Research Centres, ACIAR Impact Assessment Series 68, ACIAR (Australian Centre for International Agricultural Research), Canberra.

Meijerink, G., 2007. If services aren't delivered, people won't pay: the role of measurement problems and monitoring in Payments for Environmental Services, Paper prepared for presentation at the 106th seminar of the EAAE, Pro-poor development in low income countries: Food, agriculture, trade, and environment, 25-27 October 2007 - Montpellier, France, Agricultural Research Institute (LEI), Wageningen University and Research (WUR).

Meijerink, G. W., 1997. Incentives for tree growing and managing forest sustainably: more than just carrots and sticks Werkdocument IKC Natuurbeheer nr W-140, Stichting BOS, Wagenigen.

Meinzen-Dick, R., Mwangi, E. and Dohrn, S., 2006. Securing the commons, Policy Brief Number 4 - May 2006, CAPRi (Collective Action and Property Rights). Available from: http://dlc.dlib.indiana.edu/archive/00003102/01/polbrief_04.pdf (accessed 01/09/2008).

Meinzen-Dick, R. S. and Gregorio, M. D., 2004. Overview, In Collective action and property rights for sustainable development. 2020 Vision for Food, Agriculture and the Environment, (Eds, Meinzen-Dick, R. S. and Gregorio, M. D.), The International Food Policy Research Institute (IFPRI) and Collective Actions and Property Rights (CAPRI), Washington.

Meinzen-Dick, R. S., Pradhan, R. and Gregorio, M. D., 2004. Understanding property rights, In Collective action and property rights for sustainable development. 2020 Vision for Food, Agriculture and the Environment, (Eds, Meinzen-Dick, R. S. and Gregorio, M. D.), The International Food Policy Research Institute (IFPRI) and Collective Actions and Property Rights (CAPRI), Washington.

Michon, G. and de Foresta, H., 1992. Complex agroforestry systems and conservation of biological diversity. 1. Agroforestry in Indonesia: a link between two worlds., In In harmony with nature. An International Conference on the Conervation of Tropical Biodiversity, Kuala Lumpor, 12-16 June 1990., (Eds, Kheong, Y. S. and Win, L. S.), Malayan Nature Journal (Golden Juilee issue).

Midgley, S., Blyth, M., Mounlamai, K., Midgely, D. and Brown, A. G., 2007a. Towards improving profitability of teak in integrated smallholder farming systems in Northern Laos, Technical report No. 64, ACIAR, Canberra.

Midgley, S., Rimbawanto, A., Mahfudz, Fuazi, A. and Brown, A., 2007b. Options for teak industry development in South-East Sulawesi, Indonesia, ACIAR (Australian Centre for International Agricultural Research), Canberra.

Miettinnen, O. and Lammi, H., 2002. A study on the Finnish involvement in Industrial Pulp Plantations in Indonesia: Riau Andalan Pulp and Paper (Sumatra) and Finnantara Intiga (Borneo), Climate Change Edition, Vol. 2002, World Rainforest Movement.

Mingers, J., 2001. Combining IS research methods: Towards a pluralist methodology Information systems research 12(3): 240-259. Available from: http://gkmc.utah.edu/7910F/papers/ISR%20combining%20IS%20research%20methods.pdf (accessed 11/05/2009).

Mingers, J. and Brocklesby, J., 1997. Multimethodology: Towards a framework for mixing methodology, Omega International Journal Management of Science, 25(5): 489-509. Available from: http://www.sciencedirect.com/science?_ob=PublicationURL&_tockey=%23TOC%235944%231997%23999749994%2312957%23FLP%23&_cdi=5944&_pubType=J&_auth=y&_acct=C000028338&_version=1&_urlVersion=0&_userid=554534&md5=c7422404b80670af06cb2df1071c8745 (accessed 11/05/2009).

Minister of Forestry of Indonesia, 2006. Sambutan menteri kehutanan pada pembukaan Workshop Nasional Pengembangan Hutan Tanaman Rakyat (Minister of Forestry speech at the opening of the National Workshop on Community-based plantation forests), 20 December 2006, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

Ministry of Environment, 2007. Status lingkungan hidup Indonesia 2006 (Indonesia Environment Status 2006), Ministry of Environment (Kementerian Lingkungan Hidup), Jakarta.

Mishan, E. J., 1976. Cost-Benefit Analysis, new and expanded edition, Praeger New York, Washington, and London.

MoF, 1997. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 1996/1997, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 1999a. Peta penunjukan kawasan hutan Propinsi Jambi (SK No. 421/Kpts-II/1999 tanggal 15 Juni, 1999) (Map of forest areas designation in Jambi Province (SK No. 421/Kpts-II/1999 dated 15 June, 1999)), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 1999b. Peta penunjukan kawasan hutan Propinsi Nusa Tenggara Barat (SK No. 418/Kpts-II/1999 tanggal 15 Juni 1999) (Map of forest areas designation in West Nusa Tenggara Province (SK No. 418/Kpts-II/1999 dated 15 June, 1999)), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 1999c. Statistik kehutanan Indonesia (Forestry statistics of Indonesia)1998, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2000a. Peta penunjukan kawasan hutan dan perairan Propinsi Kalimantan Barat SK No. 259/Kpts-II/2000 tanggal 23 Agustus, 2000 (Map of forest areas designation in West Kalimantan Province (SK No. 259/Kpts-II/2000 dated 23 August, 2000)), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2000b. Statistik kehutanan Indonesia (Forestry statistics of Indonesia)1999, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2001a. Peraturan Menteri Kehutanan Nomor: 31/Kpts-II/2001 tentang penyelenggaraan hutan kemasyarakatan (Minister of Forestry regulation number 31/Kpts-II/2001 on the implementation of community forestry), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/index.php?q=id/node/718 (accessed 26/08/2009).

MoF, 2001b. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2000, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2001c. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2001, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/INFORMASI/STATISTIK/2001/RLPS/ii_4_2.htm (accessed 18/04/2010).

MoF, 2002a. Rehabilitasi lahan dan perhutanan sosial (Land rehabilitation and social forestry), Statistik Kehutanan Indonesia 2001 (Forestry statistics Indonesia 2001) Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/INFORMASI/STATISTIK/2001/RLP_01_N.htm (accessed 23/02/2008).

MoF, 2002b. Statistik kehutanan Indonesia(Forestry statistics of Indonesia) 2001, Ministry of Forestry(MoF), The Government of Indonesia, Jakarta.

MoF, 2003a. Lampiran Keputusan Menteri Kehutanan Nomor: 163/Kpts-II/2003, 26 Mei 2003, tentang: Pengelompokan jenis kayu sebagai dasar pengenaan iuran kehutanan (Attachment to the Decree of the Minister of Forestry Number:163/Kpts-II/2003, May 26, 2003, concerning: Category of wood type as the basis for applying forestry tariff, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/informasi/skep/skmenhut/163_03/l_163_03_I.htm (accessed 10/01/2012).

MoF, 2003b. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2002, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2004a. Keputusan Menteri Kehutanan Nomor: SK. 48/Menhut-II/2004 tentang Perubahan keputusan menteri kehutanan Nomor 70/KPTS-II/2001 tentang penetapan kawasan hutan, perubahan status dan fungsi kawasan hutan (Minister of Forestry Decree No SK. 48/Menhut-II/2004 on the changes to Minister of Forestry Decree No. 70/KPTS-II/2001 on the designation of forest areas, the changes of status and function of forest areas), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2004b. Peraturan Menteri Kehutanan Nomor: P. 01/Menhut-II/2004 tentang pemberdayaan masyarakat setempat di dalam dan atau sekitar hutan dalam rangka social forestry (Minister of Forestry regulation number 01/Menhut-II/2004 on the development programme under social forestry framework for community residing inside and or on the surrounding forest), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/index.php?q=id/node/318 (accessed 26/08/2009).

MoF, 2004c. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2003, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2004d. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2004, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/INFORMASI/STATISTIK/2004/dafsi.htm (accessed 18/04/2010).

MoF, 2005. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2004, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2006a. Peraturan Menteri Kehutanan Nomor: P. 55/Menhut-II/2006 tentang penatausahaan hasil hutan yang berasal dari hutan negara (Minister of Forestry regulation number P. 55/Menhut-II/2006 on management of forest products from state forests), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. 26/08/2009).

MoF, 2006b. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 51/Menhut-II/2006 tentang penggunaan Surat Keterangan Asal Usul Kayu (SKAU) untuk pengangkutan hasil hutan kayu yang berasal dari hutan hak (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 51/Menhut-II/2006 on the procedure for using the Certificate of Origin for timber coming from community privately-owned forests).

MoF, 2006c. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 55/Menhut-II/2006 tentang penatausahaan hasil hutan yang berasal dari hutan negara (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 55/Menhut-II/2006 on the procedure for timber administration of timber production coming from state production forests).

MoF, 2006d. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 62/Menhut-II/2006 tentang perubahan peraturan menteri kehutanan nomor P. 51/Menhut-II/2006 tentang penggunaan Surat Keterangan Asal Usul (SKAU) untuk pengangkutan hasil hutan kayu yang berasal dari hutan hak (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 62/Menhut-II/2006 on the modification to the decree No P.51/Menhut-II/2006 on the uses of Certificate of Origin for transporting timber production coming from community privately-owned forests).

MoF, 2006e. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2005, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2007a. Peraturan Menteri Kehutanan Nomor: P. 18/Menhut-II/2007 tentang petunjuk teknis tata cara pengenaan, pemungutan dan pembayran Provisi Sumber Daya Hutan (PSDH) dan Dana Reboisasi (DR) (Minister of Forestry regulation number P. 18/Menhut-II/2007 on technical guidelines to apply, collect and its payment for forest resource provision and reforestation fund), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. 26/08/2009).

MoF, 2007b. Peraturan Menteri Kehutanan Nomor: P. 37/Menhut-II/2007 tentang hutan kemasyarakatan (Minister of Forestry regulation number P. 37/Menhut-II/2007 on community forestry scheme), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/files/p18_09_0.pdf (accessed 26/08/2009).

MoF, 2007c. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 18/Menhut-II/2007 tentang petunjuk teknis tata cara pengenaan, pemungutan dan pembayaran Provisi Sumber Daya Hutan (PSDH) dan Dana Reboisasi (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 18/Menhut-II/2007 on the procedure for applying, collecting and payment of Forest Resource Rent and Reforestation Fund).

MoF, 2007d. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 33/Menhut-II/2007 tentang perubahan kedua atas peraturan menteri kehutanan nomor P. 51/Menhut-II/2006 tentang penggunaan Surat Keterangan Asal Usul (SKAU) untuk pengangkutan hasil hutan kayu yang berasal dari hutan hak (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 33/Menhut-II/2007 on the second modification to the uses of Certificate of Origin for transporting timber production comming from community privately-owned forests).

MoF, 2007e. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2006, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2008a. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 62/Menhut-II/2008 tentang Rencana kerja usaha pemanfaatan hasil hutan kayu Hutan Tanaman Industri dan Hutan Tanaman Rakyat (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 62/Menhut-II/2008 on working plan for Industrial Timber Plantation and Community-based Timber Plantation), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2008b. Statistik kehutanan Indonesia (Forestry statistics of Indonesia)2009, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2009a. Berita acara hasil evaluasi penetapan areal kerja Hutan Kemasyarakatan pada areal pembangunan HTI/Hkm (eks Perhum Perhutani) di Kabupaten Bima Provinsi Nusa Tenggara Barat (Notes based on the evaluation on the designation of the community forestry areas on ex-Perhutani sites in Bima District, Province of West Nusa Tenggara), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2009b. Kebijakan pembangunan Hutan Tanaman Industri (HTI) (Policy for Industrial Plantation Forest), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2009c. Laporan keuangan Departemen Kehutanan bagian anggaran 999.06 Tahun 2009 (audited) (Financial report for the Ministry of Forestry 999.06 Year 2009), Untuk periode yang berakhir 31 Desember 2009 (For the period ending by 31 December 2009), MoF (Ministry of Forestry), Jakarta. Available from: http://www.dephut.go.id/files/LK_99906_2009.pdf (accessed 29/06/2012).

MoF, 2009d. Peraturan Menteri Kehutanan Nomor: P. 18/Menhut-II/2009 tentang perubahan atas peraturan menteri kehutanan Nomor P.37/Menhut-Ii/2007 Tahun 2007 tentang hutan kemasyarakatan (Minister of Forestry regulation number P. 18/Menhut-II/2009 on the amendment to the Minister of Forestry regulation number P.37/Menhut-Ii/2007 on community forestry scheme), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/files/p18_09_0.pdf (accessed 26/08/2009).

MoF, 2009e. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P.13/Menhut-II/2009 tentang hutan tanaman hasil rehabilitasi (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 13/Menhut-II/2009 on the timber plantations resulting from the forest rehabilitation programme).

MoF, 2009f. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 46/Menhut-II/2009 tentang tata cara pemberian izin pemungutan hasil hutan kayu atau hasil hutan bukan kayu pada hutan produksi (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 46/Menhut-II/2009 on the procedure to harvest timber and non-timber forest products in production forests), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2009g. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 50/Menhut-II/2009 tentang Penegasan Status dan Fungsi Kawasan Hutan (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 50/Menhut-II/2009 on Affirmation of Status and Functions of Forest Areas), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2009h. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 64/Menhut-II/2009 tentang Standard biaya pembangunan Hutan Tanaman Industri dan Hutan Tanaman Rakyat (Government of Indonesia, Minister of Forestry

Regulation Nomor: P. 64/Menhut-II/2009 on the costing standard for Industrial Timber Plantation and Community-based timber plantation).

MoF, 2009i. Statistik kehutanan Indonesia (Forestry statistics of Indonesia) 2008, Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/files/Statistik_Kehutanan_2008_RLPS.pdf (accessed 18/04/2010).

MoF, 2010a. Diagram penerbitan Surat Keterangan Asal Usul (SKAU) (Flow chart to produce Certificate of Origin), MoF (Ministry of Forestry). Available from: http://www.dephut.go.id/files/Alur_SKAU.pdf (accessed 06/05/2010).

MoF, 2010b. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P. 32/Menhut-II/2010 tentang Tukar Menukar Kawasan Hutan, (Government of Indonesia, Minister of Forestry Regulation Nomor: P. 32/Menhut-II/2010 on Interchangeability of State Forest Area), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta.

MoF, 2010c. Statistik Direktorat Jenderal Bina Produksi Kehutanan 2009 (Statistics of Director General of Forestry Production Management 2009), Direktorat Jenderal Bina Produksi Kehutanan (Director General of Forestry Production Management), Departemen Kehutanan (Ministry of Forestry), Jakarta.

MoF, 2010d. Statistik Direktorat Jenderal Bina Produksi Kehutanan 2009 (Statistics of Directorate General Forestry Production Management), Ministry of Forestry (MoF),The Government of Indonesia, Jakarta.

MoF, 2011. Data release Direktorat Jenderal Bina Usaha Kehutanan triwulan II tahun 2011 (Data release from Directorate General of Forest Production Management for the second quarter of 2011) Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: http://www.dephut.go.id/files/ReleaseBUK_TriwulanII_2011.pdf (accessed 03/11/2012).

MoF, Undated. Pengalaman pengembangan Hutan Kemasyarakatan di Nusa Tenggara Barat, (Experiences in developing community forestry scheme in West Nusa Tenggara), Ministry of Forestry (MoF), The Government of Indonesia, Jakarta. Available from: www.dephut.go.id/informasi/propinsi/ntb/hkm_ntb.htm (accessed 26/01/2011).

MoF and CBS, 2004. Potensi Hutan Rakyat Indonesia-PHRI 2003 (The farm forestry potential in Indonesia in 2003), Pusat Inventarisasi dan Statistik Kehutanan (Center for forest inventory and statistics), Ministry of Forestry (MoF); and Direktorat Statistik Pertanian (Directorate Agriculture Statistics), Central Bureau of Statistics (CBS), Jakarta. Available from: http://www.dephut.go.id/Halaman/Buku-buku/2004/PHRI_03/PHRI_03.htm (accessed 24/01/2008).

Mohanty, A., 2011. Palm oil industry prepares for rocky 2012, Commodities news briefs, Thomson Reuters, Bangalore. Available from: http://www.agriskmanagementforum.org/sites/agriskmanagementforum.org

/files/Documents/Palm%20oil%20industry%20prepares%20for%20rocky%20 2012.pdf (accessed 14/11/2012).

Montambault, J. R. and Alavapati, J. R. R., 2005. Socioeconomic research in agroforesty: a decade in review, Agroforestry Systems, 65: 151-161. Available from: http://www.springerlink.com/content/n46467q643308685/fulltext.pdf (accessed 14/04/2009).

Muhtaman, D. R., Siregar, C. A. and Hopmans, P., 2000. Criteria and indicators for sustainable plantation forestry in Indonesia, CIFOR (Center for International Forestry Research) with the support of ACIAR (Australian Centre for International Agricultural Research), Bogor.

Muktasam and Hakim, M. R., 2007. An overall review of Program Sumbawa, ACIAR Project scoping review report, WWF (World Wide Fund for Nature) Indonesia Program Nusa Tenggara, Mataram.

Munoz, C. P., 2010. REDD+ Pilot Project in Indonesia Sinarmas Forestry, Power point Presentation at the International Climate Change Workshop on Research Priorities and Policy Development UI-APRU Sinarmas Forestry, Jakarta.

Muslich, M. and Krisdianto 2006. Upaya peningkatan kualitas kayu hutan rakyat sebagai bahan baku industri, Seminar Hasil Litbang Hasil Hutan, Tema: Kontribusi hutan rakyat dalam kesinambungan industri kehutanan (Seminar on research outcomes from the Center for Research and Development on Forest Products, Seminar title: Contribution of farm forestry in ensuring the sustainability of forest industry) Bogor. Badan Penelitian dan Pengembangan Kehutanan Departemen Kehutanan (Forest Research and Development Agency, Ministry of Forestry) Available from: http://www.dephut.go.id/files/BBIndustri.pdf (accessed 20/04/2010).

Nair, P. K. R. (Ed.) 1989. Agroforestry systems in the tropics, Kluwer Academic Publishers, in co-operation with ICRAF, Dordrecht and Boston.

Nair, P. K. R., 1990. The prospects for agroforestry in the tropics, World Bank, Washington, D.C.

Nawir, A., Kassa, H., Sandewall, M., Dore, D., Campbell, B., Ohlsson, B. and Bekele, M., 2007a. Stimulating smallholder tree planting-lessons from Africa and Asia, UNASYLVA-FAO-, 58(3): 53.

Nawir, A. A., 2000. Overview of small-scale Falcata plantation developed by spontaneous tree growers in Wonosobo District, Central Java, Center for International Forestry Research (CIFOR), Bogor.

Nawir, A. A., 2011. Satu dasawarsa perjalanan kemitraan masyarakat - perusahaan HTI di Indonesia: Studi kasus Finnantara Intiga, Sanggau, Kalimantan Barat (A decade of community- HTI company partnership scheme in Indonesia: Case study Finnantara Intiga, Sanggau, West Kalimantan), Jurnal Kehutananan Masyarakat (Community Forestry Journal), 3(1): 6-28.

Nawir, A. A., 2012. Towards commercially oriented community forestry management: coping with economic globalisation and commercialisation, In Conference proceedings: IUFRO 3.08.00 Small-Scale Forestry Conference 2012: Science for Solutions, 24-27 September 2012, Amherst, Massachusetts USA, (Ed, Meyer, S. R.), Family Forest Research Center (www.familyforestresearchcenter.org) – a joint project between the USDA Forest Service and the University of Massachusetts Amherst.

Nawir, A. A., 2013. Commercial community tree-growing inside state forests: an economic perspective from eastern Indonesia, International Forestry Review, 15(2): 200-217.

Nawir, A. A., Anyonge, C. H., Race, D. and Vermeulen, S., 2003a. Equitable partnerships between corporate and smallholder partners: relating partnerships to social, economic and environmental indicators, Proceeding of CIFOR and FAO Workshop, Bogor, 21-23 May 2002, CIFOR (Center for International Forestry Research) and FAO (Food and Agriculture Organization of the United Nations), Bogor and Rome.

Nawir, A. A. and ComForLink, 2007. Forestry companies' perspectives: Improving community roles in plantation forest development through partnerships, Paper for the World Bank as a contribution to the national meeting organised by Dewan Kehutanan Nasional (DKN) - National Forestry Committee on: 'Konsolidasi dan Percepatan Pelaksanaan Restrukturisasi Kehutanan' (Consolidation and revitalisation in restructuring forest policy), Jakarta, 2-3 May 2007, CIFOR, Bogor.

Nawir, A. A., Gunarso, P., Julmansyah and Hakim, M. R., 2013. Country case study: Indonesia, Power Point Presentation to Forest Landscape Restoration Workshop. Pre-session to APFC (Asia Pacific Forestry Commission) meeting, 3-8 November 2013, FAO

Nawir, A. A., Hakim, M. R., Julmansyah, Ahyar H.M.A and Trison, S., 2007b. Feasibility of community-based forestry management in partnership with a forestry district agency (case studies: Sumbawa and Bima, West Nusa Tenggara), In Integrated rural development in East Nusa Tenggara, Indonesia. Proceedings of a workshop to identify sustainable rural livelihoods, held in Kupang, Indonesia, 5-7 April 2006. ACIAR Proceedings No. 126., (Eds, Djoeroemana, S., Myers, B., Russell-Smith, J., Blyth, M. and Salean, I. E. T.), Australian Centre for International Agricultural Research (ACIAR), Canberra, pp. 150-161.

Nawir, A. A., Kassa, H., Sandewall, M., Dore, D., Campbell, B., Ohlsson, B. and Bekele, M., 2007c. Stimulating smallholder tree planting - lessons from Africa and Asia, Unasylva, 58(228 2007/3): 53-58. Available from: ftp://ftp.fao.org/docrep/fao/010/a1346e/a1346e14.pdf (accessed 08/01/2008).

Nawir, A. A. and Manalu, P., 2006. Overview of farm forestry in Indonesia, Unpublished background document for ACIAR Project Proposal Development Workshop (FST/2005/177),Yogyakarta,17-19 May Center for International Forestry Research (CIFOR), Bogor.

Nawir, A. A., Murniati and Rumboko, L., 2007d. Chapter 3. Past and present policies and programmes affecting forest and land rehabilitation initiatives, In Forest rehabilitation in Indonesia: where to after more than three decades?, (Eds, Nawir, A. A., Murniati and Rumboko, L.), Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Nawir, A. A., Murniati and Rumboko, L., 2007e. Chapter 6. Reorientation of the rehabilitation programme in Indonesia: Where to after more that three decades?, In Forest rehabilitation in Indonesia: where to after more than three decades?, (Eds, Nawir, A. A., Murniati and Rumboko, L.), Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Nawir, A. A., Murniati and Rumboko, L. (Eds.), 2007f. Forest rehabilitation in Indonesia: Where to after more than three decades?, Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Nawir, A. A., Murniati, Rumboko, L., Hiyama, C. and Gumartini, T., 2007g. Chapter 5. Portraits of rehabilitation projects in Indonesia: impacts and lessons learnt, In Forest rehabilitation in Indonesia: where to after more than three decades?, (Eds, Nawir, A. A., Murniati and Rumboko, L.), Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Nawir, A. A. and Santoso, L., 2005. Mutually beneficial company-community partnerships in plantation development: emerging lessons from Indonesia, International Forestry Review, 7(3): 177-192.

Nawir, A. A., Santoso, L. and Mudhofar, I., 2003b. Towards mutually beneficial company-community partnerships in timber plantation: lessons learnt from Indonesia, Working Paper 26, CIFOR (Center for International Forestry Research), Bogor.

Ndayambaje, J. D., Heijman, W. J. M. and Mohren, G. M. J., 2012. Household Determinants of Tree Planting on Farms in Rural Rwanda, Small-Scale Forestry, 11(4): 477-508. Available from: http://dx.doi.org/10.1007/s11842-012-9196-0 (accessed 23/04/2014).

Nemoto, A., 2002. Farm tree planting and the wood industry in Indonesia : a study of Falcataria plantations and the Falcataria product market in Java, Policy Trend Report, Forest Economic Research Institute, Japan.

Noor, K. B. M., 2008. Case study: A strategic research methodology, American Journal of Applied Sciences, 5 (11)(11): 1602-1604. Available from: http://www.scipub.org/fulltext/ajas/ajas5111602-1604.pdf (accessed 15/04/2010).

Noor, R. and Syumanda, R., 2006. Social conflict and environmental disaster: A report on Asia Pulp and Paper's operations in Sumatra, Indonesia, WRM Series on tree plantations no 8.

Noordwijk, M. V., Roshetko, J. M., Murniati, Angeles, M. D., Suyanto, Fay, C. and Tomich, T. P., 2008. Farmer tree planting barriers to sustainable forest management, In Smallholder tree growing for rural development and environmental services: Lessons from Asia. Advances in agroforestry volume 5, (Eds, Snelder, D. J. and Lasco, R. D.), Springer, pp. 429-451.

Noordwijk, M. v., Suyanto, Budidarsono, S., Sakuntaladewi, N., Roshetko, J. M., Tata, H. L., Galudra, G. and Fay, C., 2007. Is Hutan Tanaman Rakyat a new paradigm in community based tree planting in Indonesia?, ICRAF Working Paper Number 45, ICRAF (World Agroforestry Cantre) Southeast Asia Bogor.

Notten, P. v., 2005. Chapter 4 - Scenario development: a typology of approaches, Available from: http://www.oecd.org/dataoecd/27/38/37246431.pdf (accessed 14/04/2010).

Nurrochmat, D. R., 2000. Prediksi keseimbangan supply-demand hasil hutan kayu Indonesia (Prediction on the balance of supply-demand of forest product in Indonesia), Warta Fahutan Online, July: 1-3. Available from: <http://www.fahutan.s5.com/Juli/prediksi.htm> (accessed 29/10/2011).

Obidzinski, K. and Dermawan, A., 2010. Smallholder timber plantation development in Indonesia: what is preventing progress?, International Forestry Review, 12(4): 339-348.

Obidzinski, K., Dermawan, A. and Hadianto, A., 2014. Oil palm plantation investments in Indonesia's forest frontiers: limited economic multipliers and uncertain benefits for local communities, Environment, Development and Sustainability. Available from: http:/www.cifor.org/online-library/browse/view-publication/publication/4415.html (accessed 23/03/2014).

Orwa, C. M., A.;Kindt, R.;Jamnadass, R.;Simons, A., 2009. Agroforestree database: a tree species reference and selection guide version 4.0, World Agroforestry Centre ICRAF Nairobi. Available from: http://www.worldagroforestry.org/treedb2/AFTPDFS/Tectona_grandis.pdf (accessed 10/08/2011).

Ostrom, E., 1999. Self-governance and forest resources, Occasional Paper No. 20, Center for International Forestry Research, Bogor.

Ostrom, E., 2000. Private and common property rights, In Encyclopedia of Law and Economics, Vol. II: Civil Law and Economics, University of Ghent, Ghent, Belgium, pp. 332-379.

Ostrom, E., 2009. A general framework for analyzing sustainability of social-ecological systems, Science, 325(5939): 419-422.

P3SE, 2001. Pengembangan Database dan Jaringan Informasi Pertanian Lampiran B Palawija (Agricultural database and information development, Annex B Horticulture) P3SE (Pusat Penelitian dan Pengembangan Sosial Ekonomi Pertanian), Badan Penelitian dan Pengembangan Pertanian - Center for Socioeconomic Research and Development, Agency for Agricultural Research and Development, Bogor.

Partnership for Governance Reform, 2011. Mendorong percepatan program hutan kemasyarakatan dan hutan desa (Accelerating the programme on community forestry and village forests), Partnership policy paper No. 4/2011, Partnership for Governance Reform, Jakarta.

Pasicolan, P. N., Udo de Haes, H. A. and Sajise, P. E., 1997. Farm forestry: an alternative to government-driven reforestation in the Philippines, Forestry Ecology and Management, 99: 261-274.

Patton, M., 1987. How to use qualitative methods in evaluation, Sage Publication, California.

Pearce, D., 2001. The economic value of forest ecosystems, Ecosystem Health, 7(4): 284.

Pearce, D. W., Markandya, A. and Barbier, E. B., 1989. Blueprint for green economy, Earthscan, London.

Pearse, P. H., 1990. Introduction to forestry economics, University of British Columbia Press, Vancouver.

Pemda Bima, 2007. Peraturan Daerah Kabupaten Bima Nomor 11 Tahun 2007: Rencana Tata Ruang Wilayah, (Local government regulation No. 11 2007 on regional spatial planning), Pemerintah Kabupaten Bima (District Government of Bima), Bima.

Pemda Bima and WWF Indonesia NT Programme, 2010. Outline penyusunan dokumen PSDHBM Kabupaten Bima (Outline for drafting the document on PSDHBM District of Bima), Pemda Bima - Pemerintah Kabupaten Bima (District Government of Bima) and WWF (World Wide Fund for Nature), Bima.

Peramune, M. R. and AFS, B., 2007. A value chain assessment of the rubber industry in Indonesia, A Project Implemented by Development Alternatives, Inc., USAID (the United States Agency for International Development), Washington.

Perdana, A., Roshetko, J. M. and Kurniawan, I., 2012. Forces of competition: smallholding teak producers in Indonesia, International Forestry Review, 14(2): 238-248. Available from: <Go to ISI>://WOS:000306206800009 (accessed 23/03/2014).

Perhutani, 2010. History of Perhutani. Available from: http://www.perumperhutani.com/index.php/profile-en/history-of-perhutani (accessed 12/11/2010).

Perkins, F., 1994. Practical Cost Benefit Analysis, Macmillan Education Australia, Melbourne.

Perman, R., Ma, Y. and McGilvray, J., 1996. Natural resources and environmental economics, MIS Quarterly, Longman, London and New York.

PERSEPSI and WWF, 2003. Studi identifikasi unit manajemen dalam rangka menuju sertifikasi hutan jati rakyat dan pengembangan akses pasar yang berkeadilan (Identification study on management unit for certification of farm forestry teak and fair market development) PERSEPSI and WWF (World Wide Fund for Nature), Wonogiri.

Pesket, L., 2010. REDD+ Benefit Sharing in Indonesia: a case study, The World Bank, Washington.

PESUT, 1996. Perjanjian kerja sama kemitraan antara PT. Putra Sumber Utama Timber dengan Kelompok Tani dalam penyelenggaraan Kredit Usaha Perhutanan Rakyat, (Partnership agreement between PT. Putra Sumber Utama Timber with farmer group in implementing the farm forestry credit scheme), PESUT (Putra Sumber Utama Timber), Jambi.

Pirard, R. and Cossalter, C., 2006. The revival of industrial forest plantations in Indonesia's Kalimantan Provinces: Will they help eliminate fiber shortfalls at Sumatran pulp mills or feed the China market?, Working Paper No. 37, CIFOR (Center for International Forestry Research), Bogor.

PKSK & BRLKT, 2004. Laporan akhir penyusunan rancangan teknik Sosial Forestry pada sreal pembangunan model Sosial Forestry di Kecamatan Empang Kabupaten Sumbawa, Provinsi NTB (Final report on social forestry technical design for social forestry area development model in Empang, Sumbawa District, West Nusa Tenggara) Pusat Kajian Sumberdaya Kehutanan (PKSK) Fakultas Pertanian Universitas Mataram bekerjasama dengan Sub BRLKT (Balai Rehabilitasi Lahan dan Konservasi Tanah) DAS Dodokan Moyo Sari, NTB (Research Center on Forest Resources of Agricultur Faculty, Mataram University, in collaboration with, Sub-center for land rehabilitation and soil conservation, Dodokan Moyo Sari Watershed,West Nusa Tenggara), Mataram.

Place, F., Otsuka, K. and Scherr, S., 2004. Property rights, collective action, and agroforestry In Collective action and property rights for sustainable development. 2020 Vision for Food, Agriculture and the Environment, (Eds, Meinzen-Dick, R. S. and Gregorio, M. D.), The International Food Policy Research Institute (IFPRI) and Collective Actions and Property Rights (CAPRI), Washington.

Pokja Pemberdayaan Masyarakat, 2006. Analisis kelayakan program kemitraan Hutan Tanaman Rakyat (Feasibility analysis of partnership programme under Community-based Forestry Plantation Programme), Pokja (Kelompok Kerja) Pemberdayaan Masyarakat (Working group on forest community development), Directorate General of Forestry Production Management, Ministry of Forestry (MoF), Jakarta.

Pokja Pemberdayaan Masyarakat, 2007. Laporan peninjauan lapangan masyarakat di PT Wirakarya Sakti, Provinsi Jambi, (Report on field visit to community in concessions of PT. Wirakarya Sakti, Jambi Province), Pokja (Kelompok Kerja)Pemberdayaan Masyarakat (Working group on forest community development), Ministry of Forestry (MoF), Jakarta.

Pokja Pemberdayaan Masyarakat and APHI, 2007. Pemberdayaan masyarakat di dalam dan di sekitar Hutan Tanaman Industri di PT. Finnantara Intiga, (Forest community development inside and on the surrounding areas of industrial forestry plantations of PT. Finnantara Intiga), Pokja (Kelompok Kerja)Pemberdayaan Masyarakat (Working group on forest community development), Ministry of Forestry (MoF) and APHI-Assosiasi Pengusaha Hutan Indonesia (Forest concessionaires association), Jakarta.

Pokorny, B., Hoch, L. and Maturana, J., 2007. Smallholder forest plantations in the tropics: local people between outgrower schemes and reforestation programs, Planted forests and sustainable development, In Proceedings of the International Congress on Cultivated Forests, Scientific forum on ecosystem goods and services from planted forests, Bilbao.

Pokorny, B., Hoch, L. and Maturana, J., 2010. Chapter 6. Smaholder plantations in the tropics-local people between outgorwer schemes and reforestation programmes, In Ecosystem goods and ser-vices from plantation forests, (Eds, Bauhus, J., van der Meer, P. and Kanninen, M.), CIFOR (Center for International Forestry Research), Bilbao, pp. 272.

Potess, L. F., 1995. Report on socioeconomic survey of communities living within the proposed Sanggau Timber Estate Project, Enso Forest Development Oy LTD, Sanggau.

Potess, L. F., 1997. An assessment of PT Finnantara Intiga's land and community development work, PT Finnantara Intiga, Sanggau/Sintang.

Potter, L. and Lee, J., 1998. Tree planting in Indonesia: Trends, impacts and directions, Occasional Paper No. 18, Center for International Forestry Research (CIFOR), Bogor.

Predo, C. D., 2003. What motivates farmers? Tree growing and land use decisions in grasslands of Claveria, Philippines Research report No. 2003-RR7, EEPSEA (Economy and Environment Program for Southeast Asia and IDRC (The International Development Research Centre). Available from: http://www.idrc.ca/uploads/user-S/10705057151CanesioRRlayout.doc (accessed 04/09/2009).

Predo, C. D. and Francisco, H. A., 2008. Improving productivity, profitability and sustainability of degraded grassland through tree-based land use systems in the Philippines, In Smallholder tree growing for rural development and environmental services: Lessons from Asia, Advances in agroforestry volume 5, (Eds, Snelder, D. J. and Lasco, R. D.), Springer.

Pretty, J. and Ward, H., 2001. Social capital and the environment, World Development, 29(2): 209-227.

Puspitasari, W. E. 2003. Analisis kelayakan investasi pengusahaan kelapa sawit oleh petani plasma di Desa Beringin Agung, Propinsi Kalimantan Tengah (Studi kasus pola kemitraan dengan PT. Hati Prima Agro (Feasibility analysis of investment on palm oil plantations (Elaeis guineensis jacq) in Beringin Village , Central Kalimantan Province - Case study on partnership scheme with company PT Hati Prima Agro). Institut Pertanian Bogor (Bogor Agricultural Institute).

Putzel, L., Dermawan, A., Moeliono, M. and Trung, L. Q., 2012. Improving opportunities for smallholder timber planters in Vietnam to benefit from domestic wood processing, International Forestry Review, 14(2): 227-237. Available from: <Go to ISI>://WOS:000306206800008 (accessed 23/03/2014).

Race, D., 1999. Forest Company-Community Partnership Ingredients for Success, Discussion Paper 9 April 1999, Department of Forestry, Australian National University, Canberra.

Raintree, J. B., 1991. Socioeconomic attributes of trees and tree planting practices, Community Forestry Note No. 9, FAO, Rome. Available from: http://www.fao.org/DOCREP/006/U4375E/U4375E00.HTM#TopOfPage (accessed 05/08/2009).

Raitzer, D., Nawir, A. A., Roshetko, J. and Campbell, B., 2006. Ex ante assessment of economic impacts from silviculture and marketing research for teak farm forestry in Java, Center for International Forestry Research., Bogor.

Resosudarmo, I. A. P. and Colfer, J. P. C., 2003. Which way forward ? People and policy making in Indonesia, Yayasan Obor, Jakarta.

Reyes-Garcia, V., Carlos Ledezma, J., Paneque-Galvez, J., Orta, M., Gueze, M., Lobo, A., Guinart, D. and Catarina Luz, A., 2012. Presence and purpose of nonindigenous peoples on indigenous lands: A descriptive account from the Bolivian lowlands, Society & Natural Resources, 25(1-3): 270-284. Available from: <Go to ISI>://WOS:000301515500022 (accessed 23/03/2014).

Richards, M., Davies, J. and Yaron, G., 2003. Stakeholder incentives in participatory forest management. A manual for economic analysis, ITDG (Intermediate Technology Development Group) Publishing, London.

Rihoux, B., 2006. Qualitative Comparative Analysis (QCA) and related systematic comparative methods: Recent advances and remaining challenges for social science research, International Sociology, 21(5): 679-706. Available from: http://iss.sagepub.com/cgi/reprint/21/5/679 (accessed

Robiglio, V., Lescuyer, G. and Cerutti, P. O., 2013. From Farmers to Loggers: The Role of Shifting Cultivation Landscapes in Timber Production in Cameroon, Small-Scale Forestry, 12(1): 67-85. Available from: <Go to ISI>://WOS:000316085000006 (accessed 23/03/2014).

Roshetko, J. M., E. Nugraha, Tukan, J. C. M., Manurung, G., Fay, C. and Noordwijk, M. v., 2007. Agroforestry for livelihood enhancement and enterprise development, In Integrated rural development in East Nusa Tenggara, Indonesia. Proceedings of a workshop to identify sustainable rural livelihoods, held in Kupang, Indonesia, 5-7 April 2006, ACIAR Proceedings No. 126, (Eds, Djoeroemana, S., Myers, B., Russell-Smith, J., Blyth, M. and Salean, I. E. T.), Australian Centre for International Agricultural Research (ACIAR), Canberra, pp. 137-148.

Roshetko, J. M., Snelder, D. J., Lasco, R. D. and Noordwijk, M. V., 2008. Future challenge: A paradigm shift in the forestry sector, In Smallholder tree growing for rural development and environmental services: Lessons from Asia. Advances in agroforestry volume 5, (Eds, Snelder, D. J. and Lasco, R. D.), Springer.

Roshykin, H., 2005. Resolusi konflik sosial dan lahan di Finnantara Intiga Propinsi Kalimantan Barat. Paper Finnantara Intiga disampaikan dalam rangka Round Table Discussion Menyikapi Kasus-Kasus Tenurial di Areal Hak Pengusahaan Hutan, APHI - WG Tenure, 22 Februari 2005, (Resolution to social and land conflicts in Finnantara Intiga, West Kalimantan Province. Finnantara Intiga Paper presented in the round table discussion on tenurial cases inside concessions organised by APHI - Working Group Tenure, 22 February, 2005), Finnantara Intiga, Jakarta.

Ross, M., 2001. Timber booms and institutional breakdown in Southeast Asia, Cambridge University Press, Cambridge.

Royo, A. G., Hardiyanto, A., Alamsyah, Z. and Hasanuddin, L., 2010. Multistakeholder Forestry ProgramMilestones and Challenges, External Evaluators' Review. Norad Collected Reviews 10/2010, Norad (Norwegian Agency for Development Cooperation), Jakarta.

Ruseva, T., Evans, T. and Fischer, B., 2014. Variations in the Social Networks of Forest Owners: The Effect of Management Activity, Resource Professionals, and Ownership Size, Small-Scale Forestry: 1-19. Available from: http://dx.doi.org/10.1007/s11842-014-9260-z (accessed 23/04/2014).

Sabani, R., Taqiuddin, M. and Suharto, 2003. Pengembangan kapasitas legislatif dalam upaya pengelolaan hutan berbasis masyarakat, In Dari pemerintah ke rakyat: Distribusi kewenangan pengelolaan hutan. Inisiatif Perda PSDHBM Kabupaten Sumbawa, Propinsi NTB (From government to the people: Distribution of authority on forest management. PSDHBM initiative of Sumbawa District Government, NTB Province) (Eds, Putro, W. D., Suryadi, S., Sabani, R., Julmansyah, Taqiuddin, Jabir, M. and Suharto), LP3ES, DFID, DPRD Sumbawa, Jakarta, pp. 87-147.

Sabastian, G., Kanowski, P., Race, D., Williams, E. and Roshetko, J. M., 2014. Household and farm attributes affecting adoption of smallholder timber management practices by tree growers in Gunungkidul region, Indonesia, Agroforestry Systems. Available from: http:/www.cifor.org/online-library/browse/view-publication/publication/4416.html (accessed 23/03/2014).

Saez, C. A. and Requena, J. C., 2007. Reconciling sustainability and discounting in Cost-Benefit Analysis: A methodological proposal, Ecological Economics, 60(4): 712-725. Available from: http://www.sciencedirect.com (accessed 13 March 2008).

Safitri, M. A., 2006. Change without reform? Community forestry in decentralizing Indonesia, Paper presented at the 11th IASCP Conference, 19-23 June, Bali Available from:

http://dlc.dlib.indiana.edu/archive/00002012/00/Safitri_Myrna_Change.pdf (accessed 28/04/2009).

Sagoff, M., 2000. Environmental economics and the conflation of value and benefit, Environmental Science & Technology, 34(8): 1426-1432. Available from: <Go to ISI>://CCC:000086456100009 - http://pubs.acs.org (accessed 27/05/2009).

Santos Martín, F., Bertomeu, M., Noordwijk, M. and Navarro, R., 2012. Understanding forest transition in the Philippines: main farm-level factors influencing smallholder's capacity and intention to plant native timber trees, Small-Scale Forestry, 11(1): 47-60. Available from: http://dx.doi.org/10.1007/s11842-011-9166-y (accessed 23/03/2014).

Scherr, S., 1995. Economic analysis of agroforestry systems: The farmers' perspective, In Costs, benefits, and farmer adoption of agroforestry. Project experience in Central America and the Caribbean (A CATIE-IFPRI-World Bank Project funded by UNDP). World Bank Environment Paper Number 14, World Bank Symposium, (Eds, Current, D., Lutz, E. and Scherr, S.), World Bank, Washington, pp. 28-44.

Scherr, S. J., 1997. Meeting household needs: farmer tree-growing strategies in Western Kenya, In Farms, trees and farmers: Responses to agricultural intensification, (Eds, Arnold, J. E. M. and Dewees, P. A.), Earthscan, London, pp. 141-173.

Scherr, S. J., 2004. Building opportunities for small-farm agroforestry to supply domestic wood markets in developing countries, Agroforestry Systems, 61: 357-370.

Scherr, S. J., White, A. and Kaimowitz, D., 2003. Making markets work for forest communities, International Forestry Review, 5(1): 67-73. Available from: http://www.atypon-link.com/CFA/doi/pdf/10.1505/IFOR.5.1.67.17423?cookieSet=1 (accessed 15/04/2009).

Scherr, S. J., White, A. and Kaimowitz, D., 2004. A new agenda for forest conservation and poverty reduction: Making markets work for low-income producers, Forest Trends, CIFOR (Center for International Forestry Reserach), IUCN (The Wiorld Conservation Union), Washington, D.C. Available from: http://www.cifor.cgiar.org/templates/PubPredefined.aspx?NRMODE=Published&NRORIGINALURL=%2fKnowledge%2fPublications%2fBooks%2f&NRNODEGUID=%7b1DA42E06-70FE-480F-818F-4B3439FAE0CD%7d&NRCACHEHINT=NoModifyGuest (accessed 23/22/2007).

Schneck, J., 2008. Finnantara Intiga in brief: Before and after Sinarmas Forestry, (Power Point), Finnantara.

Schneck, J., 2009. Assessing the viability of HTR - Indonesia's community based forest plantation program, Master project submitted in partial fulfillment of the requirements for the Master of Envrionmental Management degree, The Nicholas School of the Environment of Duke University.

Schoemaker, P. J. H., 2005. Scenario planning: a tool for strategic thinking Sloan Management Review, 36(2 (Winter)): 25-40. Available from: http://pao.chadwyck.com/journals/displayItemFromId.do?QueryType=journals&ItemID=m158#listItem22 (accessed 13/04/2010).

Schuren, S. H. G. and Snelder, D. J., 2008. Tree growing on farms in Northeast Luzon (The Philippines): Smallholders' motivations and other determinants for adopting agroforestry systems In Smallholder tree growing for rural development and environmental services: Lessons from Asia. Advances in agroforestry volume 5, (Eds, Snelder, D. J. and Lasco, R. D.), Springer, pp. 75-97.

Schwarzbauer, P. and Rametsteiner, E., 2001. The impact of SFM-certification on forest product markets in Western Europe - an analysis using a forest sector simulation model, Forest Policy and Economics, 2: 241-256.

Sedjo, R. A., 1983. The comparative economics of plantation forestry: a global assessment, Resources for the future, Washington D.C.

SETARA, Yayasan Keadilan Rakyat and PSHK-ODA, 2007. Partnership or power relationship? Studi kemitraan di PT Sari Aditya Loka/Astra Group di Propinsi Jambi (Study on partnership on oil palm plantation belonging to Sari Aditya Loka Company under the Astra Group in Jambi Province), SETARA, Yayasan Keadilan Rakyat, and PSHK-ODA (Pusat Studi Hukum dan Kebijakan dan Otonomi Daerah - Center for study on law and regional autonomy policy).

Simmons, C. S., Walker, R. T. and Wood, C. H., 2002. Tree planting by small producers in the tropics: A comparative study of Brazil and Panama, Agroforestry Systems, 56(2): 89-105. Available from: http://www.wkap.nl (accessed 12/08/2008).

Sirait, M. T., 2009. Indigenous peoples and oil palm plantation expansion in West Kalimantan, Indonesia, Universitet van Amsterdam and Cordaid memisa. Available from: http://www.internal-displacement.org/8025708F004CE90B/(httpDocuments)/41E6C7AB8F028A12C12577CF00385D8A/$file/Indigenous+people+and+oil+palmplantations+in+west+kalimantan+-+May+2009.pdf (accessed 18/01/2010).

Siregar, U. J., Rachmi, A., Massijaya, M. Y., Ishibashi, N. and Ando, K., 2007. Economic analysis of sengon (Paraserianthes falcataria) community forest plantation, as fast growing species in East Java, Indonesia, Forest Policy and Economics, 9: 822-829.

Smelser, N. J., 2003. On comparative analysis, interdisciplinarity and internationalization in sociology, International Sociology, 18(4): 643-657. Available from: <Go to ISI>://CCC:000187027100001 (accessed 28/20/2009).

SMERU, 2009. Monitoring the socioeconomic impact of the 2008/2009 global financial crisis in Indonesia, Monitoring update, SMERU Research Institute, Jakarta. Available from: www.smeru.or.id (accessed 07/12/2010).

Snelder, D. J. and Lasco, R. D., 2008. Smallholder tree growing in South and Southeast Asia, In Smallholder tree growing for rural development and environmental services: Lessons from Asia. Advances in agroforestry volume 5, (Eds, Snelder, D. J. and Lasco, R. D.), Springer.

Suara Pembaruan, 2012. Harga karet mulai turun (Rubber price started to decline), Palembang. Available from: http://www.suarapembaruan.com/home/harga-karet-mulai-turun/20864 (accessed 14/11/2012).

Sudradjat, A. and Subagyo, S., 1993. Indonesian policy and legislation in social forestry development: perspectives and experience, In Poliy and legislation in community forestry. Proceeding of workshop in Bangkok, 27 -29 January 2003, (Eds, Warner, K. and Wood, H.), RECOFT, Bangkok, pp. 169-176.

Suharjito, D. 2005. Increasing Rural Household Economy through Social Forestry, the ASEAN Workshop on Social Forestry launched by Forestry Ministry o f Indonesia in Madiun, 28-30 March 2005, Madiun, Indonesia.

Sulistianawati, 2010. Strategi dan kelayakan pengembangan usaha perkebunan kelapa sawit pola kemitraan PT. Anugerah Tani bersama dengan masyarakat (Kasus perkebunan kelapa sawit di Kabupaten Banyuasin, Sumatera Selatan) (Feasibility and strategy development of oil palm plantation business patterns partnership PT. Anugerah Tani Bersama with local people, the case of oil palm plantation in Musi Banyuasin Region, South Sumatra), Sekolah Pasca Sarjana, Institut Pertanian Bogor (Post Graduate School, Bogor Agricultural Institute), Bogor.

Sumardjani, L., 2007. Konflik sosial kehutanan: mencari pemahaman untuk penyelesaian terbaik, (Social conflict in forestry sector: search for the best solution), Working Group on Forest Land Tenure supported by Ministry of Forestry and Multistakeholder Forestry Program-DFID, Jakarta.

Sumedi, N., Undated. Mengelola hutan rakyat (silvikultural-pemasaran): belajar dari pengalaman, (Farm forestry management (silviculture-marketing): learning from experiences). Proceeding of stakeholders dialogue on community-based critical land rehabilitation, Forestry Researh and Development Agency, Ministry of Forestry (MoF), the Government of Indonesia, Ciamis. Available from: http://www.dephut.go.id/files/6.pdf (accessed 30/04/2009).

Sumirat, B. K., W., A. K., Rizal, A., Hayati, N., Nurhaedah and Purwanti, R., 2005. Forestry partnership profile in Bulukumba District ACIAR Project scoping review report FORDA (Forestry Research and Development Agency), Ministry of Forestry, Makassar.

Sunderlin, W. D., 2008. What is the role of tenure in the poverty-forest link, Power point presentation at CIFOR PEN Workshop, CIFOR, Barcelona, Spain. Available from: www.cifor.cgiar.org/pen/pubs/barcelona/10jan08/WSunderlin.ppt (accessed 4 September 2008).

Sunderlin, W. D., Angelsen, A., Belcher, B., Burgers, P., Nasi, R., Santoso, L. and Wunder, S., 2004. Livelihoods, forests, and conservation in developing countries: An overview, World Development, 33(9): 1383-1402.

Sunderlin, W. D., Resosudarmo, I. A. P., Rianto, E. and Angelsen, A., 2000. The effect of Indonesia's economic crisis on small farmers and natural forest cover in the outer islands, Center for International Forestry Research (CIFOR), Bogor.

Supardi, D., Muin, F., Herawati, Jumiati, Kartini, N., Kholis, N. and Nurdayat, M. (Eds.), 2006. Pembebasan hak yang tersandera: Pergulatan pengelolaan sumberdaya hutan Sumbawa (The Liberation of rights held hostage: The struggle of forest resource management Sumbawa), BP Arupa, Yogyakarta.

Suryadi, S., 2003. Pelembagaan kehutanan masyarakat: Ilusi atau visi (Institutionalising community forestry: illusion or vision) In Dari pemerintah ke rakyat: Distribusi kewenangan pengelolaan hutan. Inisiatif Perda PSDHBM Kabupaten Sumbawa, Propinsi NTB (From government to the people: Distribution of authority on forest management. PSDHBM initiative of Sumbawa District Government, NTB Province) (Eds, Putro, W. D., Suryadi, S., Sabani, R., Julmansyah, Taqiuddin, Jabir, M. and Suharto), LP3ES, DFID, DPRD Sumbawa, Jakarta, pp. 1-38.

Suwarno, A., Julmansyah, Nawir. A. A., Kurniawan and Hakim, M. R., 2007. Modelling optimisation scenarios of tree growing under partnership schemes for future management of Community-Based Forest Management in Sumbawa District, West Nusa Tenggara Province, MIS Quarterly, CIFOR (Center for International Forestry Research), Dishutbun Sumbawa (Forestry and Estate Crops District Agency), WWF (World Wide Fund for Nature) Indonesia Nusa Tenggara Program, and ACIAR (Australian Centre for International Agricultural Research), Bogor.

Suwarno, A., Nawir, A. A., Julmansyah and Kurniawan, 2009. Participatory modelling to improve partnership schemes for future Community-Based Forest Management in Sumbawa District, Indonesia, Environmental Modelling & Software, 24(12): 1402-1410.

Suwito, 2007. PSDHL Kabupaten Wonosobo: "Konsensus" antara PSDHBM dengan PHBM? (PSDHL Wonosobo District: "Consensus" between PSDHBM with CBFM?), Warta Tenure, 4(February). Available from: http://www.wg-tenure.org/file/Warta_Tenure/Edisi_04/Warta_Tenure_04f.pdf (accessed 13/01/2011).

Tacconi, L., Obidzinski, K. and Agung, F., 2004. Learning lessons to promote forest certification and control illegal logging in Indonesia., Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Telser, L. G., 1988. Theories of competition, North-Holland, New York, Amsterdam & London.

TERI, Undated. Study on Joint Forest Management for Ministry of Environment and Forests, Ministry of Environment and Forests. Available from: http://envfor.nic.in/divisions/forprt/terijfm.html (accessed 4/30/2001).

Thapa, B., Joshi, L., Sherpa, S. L., Karki, I. B., Kusle, R. K., Jha, Y. N. and Mainali, M. P., 1991. A community scheme to encourage private tree planting by farmers in the hills of Nepal, Network Paper 12c, ODI (Overseas Development Institution), London. Available from: http://www.odi.org.uk/resources/download/678.pdf (accessed 03/09/2009).

Tim DIMAS, 2000. Seminar Sehari: Hasil Orientasi Terhadap Pelaksanaan Kegiatan Pengembangan Masyarakat di PT. Finnantara Intiga, PT Finnantara Intiga, Sanggau.

Tjitrosemito, S. and Soerjani, M., 1991. Alang-alang control for reforestation, In Forestation of alang-alang Imperata cylindrica Beauv. var Koenigii Benth. Grassland. Lessons from South Kalimantan., (Eds, Sabarnurdin, M. S., Iswantoro, H. and Adjers, G.).

Tomaselli, M., Timko, J. and Kozak, R., 2012. The Role of Government in the Development of Small and Medium Forest Enterprises: Case Studies from The Gambia, Small-Scale Forestry, 11(2): 237-253. Available from: http://dx.doi.org/10.1007/s11842-011-9181-z (accessed 23/03/2014).

Torres-Lezama, A., Vilanova, E. and Ramirez-Angulo, H., Planning and Policy Issues in Small-scale Forestry Development in Southern Aragua State, Venezuela, Small-Scale Forestry, 9(3): 281-295. Available from: <Go to ISI>://CCC:000286810800002 (accessed 23/03/2014).

Triple Line Consulting, 2005. IFC-PENSA Sawn Timber Market Study (Final Report), Program for Eastern Indonesia SME Assistance International Finance Corporation, Jakarta.

Turner, B. L., Lambin, E. F. and Reenberg, A., 2007. The emergence of land change science for global environmental change and sustainability, Proceedings of the National Academy of Sciences of the United States of America, 104 (52): 20666-20671.

TUV International Indonesia, 2008. Public summary Sustainable Forest Management Certification, PT Wirakarya Sakti District I, II, III, IV, V, VI, and VII, Jambi Provinceby certification body PT. TUV International Indonesia, PT TUV International Indonesia (TUV Rheinland Group) and the Indonesian Ecolabelling Institute (LEI).

Ume-Laila and Anjum, F., 2001. Socio-economic impat of social forestry on farmers in District Faisalabad, Pakistan Journal of Applied Science, 1(1): 42-43. Available from: http://scialert.net/pdfs/jas/2001/42-43.pdf (accessed 03/09/2009).

University of Florida, 2010. The financial analysis, Florida forest stewardship, University of Florida. Available from: http://www.sfrc.ufl.edu/extension/florida_forestry_information/planning_and_assistance/financial_analysis.html (accessed 19/11/2010).

Unja, 2007. Studi tentang analisis model pembangunan Hutan Tanaman Rakyat Pola Kemitraan di Propinsi Jambi (Studi kasus) (Study on the analysis of forestry plantations development under partnership scheme arrangements in Jambi Province (Case Study), Fakultas Pertanian (Faculty of Agriculture), Universitas Jambi (University of Jambi), Jambi.

Urama, K. C., 2004. Status, growth and the environment: Goods as symbols in applied welfare economics, Ecological Economics, 49(3): 414-415. Available from: http://www.elsevier.com (accessed 27/05/2009).

USAID, 2009. Adjusting price for inflation and creating price indices, FEWS (Famine Early Warning Systems Network) NET Markets Guidance, No. 3, USAID (the United States Agency for International Development), Washington. Available from: http://www.fews.net/docs/Publications/MT%20Guidance_Price%20Adjustment%20for%20Inflation_No%203_En.pdf (accessed 20/07/2010).

Vedeld, P., Angelsen, A., Sjaastad, E. and Kobugabe, B., 2004. Counting on the environment: Forest incomes for the rural poor, Environmental Economic Series No. 98, World Bank, Washington, D. C. Available from: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/09/30/000090341_20040930105923/Rendered/PDF/300260PAPER0Counting0on0ENV0EDP0198.pdf (accessed 30/08/2009).

Venn, T. J., 2005. Financial and economic performance of long-rotation hardwood plantation investments in Queensland, Australia, Forest Policy and Economics, 7(3): 437-454. Available from: http://www.elsevier.nl (accessed 17/03/2008).

Warner, K., 1997. Patterns of tree growing by farmers in eastern Africa, (Eds, Arnold, J. E. M. and Dewees, P. A.), Earthscan, London, pp. 90-137.

Warner, K., 2002. Moving forward: developing pathways for sustainable livelihoods through forestry, Second international workshop on participatory forestry in Africa. Defining the way forward: sustainable livelihoods and sustainable forest management through participatory forestry, 18-22 February 2002 Food and Agriculture Organization of the United Nations Arusha, United Republic of Tanzania. Available from: http://www.fao.org/docrep/006/y4807b/y4807b00.htm (accessed

Warner, K., 2007. Big trees for little people: managing forests for poverty reduction, In A cut for the poor. Proceedings of the International Conference on Managing Forests for Poverty Reduction: Capturing opportunities in forest harvesting and wood processing for the benefit of the poor. Ho Chi Minh, Vietnam 3-6 October 2006, (Eds, Oberndorf, R., Durst, P., Mahanty, S., Burslem, K. and Suzuki, R.), FAO and RECOFT, Bangkok, pp. 10-18.

Watala, 2008. [Studi Collaborasi] Mendukung hutan kemasyarakatan secara lebih adil dan demokratis, di Lampung ([Collaborative study] to support more fair and democratic community forestry, in Lampung), Watala - Friends for Nature and Environment, Bandar Lampung. Available from: http://wg-pemberdayaan.org/wp-content/uploads/data/laporan_studi_hkm_watala.pdf (accessed 23/01/2011).

White, A. and Martin, A., 2002. Who owns the world's forests? Forest tenure and public forests in transition, Forest Trends, Washington, D. C.

Wiersum, K. F., Humphries, S. and Bommel, S., 2013. Certification of community forestry enterprises: experiences with incorporating community forestry in a global system for forest governance, Small-Scale Forestry, 12(1): 15-31. Available from: http://dx.doi.org/10.1007/s11842-011-9190-y (accessed 23/03/2014).

Williams, J., 2000. Financial and other incentives for plantation establishment, In International Conference on Timber Plantation Development, November 7-9, 2000, Forest Management Bureau Department of Environment and Natural Resources Republic of the Philippines, International Tropical Timber Organisation, Food and Agricultural Organisation, Manila.

Williamson, O., 1979. Transaction cost economics, The Journal of Law and Economics, 22. Available from: http://www.heinonline.org/HOL/PDF?handle=hein.journals/jlecono22&collection=journals&id=237&print=30&sectioncount=1&ext=.pdf (accessed 11/05/2009).

Willinger, M., 1999. Non-use values and the limits of Cost-benefit Analysis, In Global environmental economics: Equity and the limits to markets, (Eds, Dore, M. H. I. and Mount, T. D.), Blackwell Publishers, Malden and Oxford, pp. 54-74.

Winter, L. G. and Prohaska, C. R., 1983. Methodological Problems in the comparative analysis of international marketing systems, Journal of the Academy of Marketing Science, 11(4). Available from: http://www.springerlink.com/content/13126nk200710444/ (accessed 24/03/2010).

WKS, 2008. Pogram Hutan Rakyat Pola Kemitraan (HRPK), (Partnership Programme on privately-owned community land outside state forests), Power point material, PT. WKS (Wirakarya Sakti), Sinarmas Group, Jambi.

Wollenberg, E., Campbell, B., Shackleton, S., Edmunds, D. and Shanley, P., 2004. Collaborative management of forests, In Collective action and property rights for sustainable development. 2020 Vision for Food, Agriculture and the Environment, (Eds, Meinzen-Dick, R. S. and Gregorio, M. D.), The International Food Policy Research Institute (IFPRI) and Collective Actions and Property Rights (CAPRI), Washington.

Wonodipuro, D., 2013. Menghijaukan lahan kritis: Potret keberhasilan hutan rakyat di Jawa (Regreening the critical land: Potrait of sucessful farm forestry in Java), In Darurat Hutan Indonesia (Emergency in Indonesian Forests), (Eds, Nugraha, A., Santoso, H., Ardiansyah, I., Imron, M. A., Sanyoto, R., Awang, S. A., Yuwono, T. and Istoto, Y. E.), Wana Aksara, Tangerang, Indonesia, pp. 279-317.

World Agroforestry Centre and PROSEA, Undated. AgroForestryTree Database, World Agroforestry Centre and PROSEA (Plant Resources of South-East Asia). Available from:

http://www.worldagroforestrycentre.org/sea/Products/AFDbases/AF/index.asp (accessed 10/08/2011).

World Bank, 1998. Report from the international Community-Based Natural Resource Management (CBNRM) workshop, 10-14 May 1998. Available from: http://info.worldbank.org/etools/docs/library/97605/conatrem/conatrem/documents/May98Workshop_Report.pdf (accessed 07/11/08).

Wulan, Y. C., Budidarsono, S. and Joshi, L. 2006. Economic analysis of improved smallholder rubber agroforestry systems in West Kalimantan, Indonesia - Implications for rubber development 2nd International Conference on Sustainable Sloping Lands and Watershed Management: Linking research to strengthen upland policies and practices, 12-15 December 2006, Luang Prabang, PDR Laos. National Agriculture and Forestry Research Institute (NAFRI).

Wunder, S., 2005. Payment for environmental services: some nuts and bolts, CIFOR Occasional Peper No. 42, Center for International Forestry Research (CIFOR), Bogor.

WWF and Dishut Kab. Bima, 2009. Gagasan pengembangan program di kawasan Parado Bima (Programme development concept in the areas of Parado Bima), WWF (World Wide Fund for Nature) Indonesia Nusa Tenggara Programme dan Dishut Kab. Bima (Dinas Kehutanan Kabupaten Bima) (Forestry District Agency of Bima), Bima.

WWF Indonesia Program Nusa Tenggara, 2007a. Final report from research on wood market performance in Sumbawa District, ACIAR Project activity report, WWF (World Wildlife Fund) Indonesia Program Nusa Tenggara, Mataram.

WWF Indonesia Program Nusa Tenggara, 2007b. Final report research on wood market performance In Sumbawa Regency, ACIAR Project activity report, WWF Indonesia Program Nusa Tenggara, Mataram.

Yin, R. K., 1981. The case study crisis: some answers, Administrative Science Quarterly, 26(1): 58-65. Available from: http://www.jstor.org/stable/2392599 (accessed 15/04/2010).

Yin, R. K., 2009. Case study research: design and methods, Sage Publication, Los Angeles.

Zen, Z., McCarthy, J. F. and Gillespie, P., 2008. Linking pro-poor policy and oil palm cultivation, Policy Brief 5, Australia Indonesia Governance Research Partnership, Crawford School of Economics and Government, ANU College of Asia and the Pacific, The Australian National University, Canberra.

Zilberman, D., 2007. Economics of resources and the environment, University of California, Berkeley, Berkeley. Available from: http://are.berkeley.edu/~zilber/EEP101/spring06/ (accessed 03/03/2009).